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SECURITY OF THE CENTRAL ASIAN ENERGY SYSTEM
THROUGH REGIONAL-LEVEL ENERGY GOVERNANCE
INNOVATIONS

By Farkhod Aminjonov

Ph.D. in Global Governance, Wilfrid Laurier University, 2015

DISSERTATION

Submitted to the Faculty of Graduate and Postdoctoral Studies in partial
fulfillment of the requirements for the Doctor of Philosophy in Global
Governance

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Abstract

The Central Asian energy system (CAES) was built during the Soviet period and designed without concern for what are today national borders. The resource sharing mechanism ensured the security of the CAES—reliable and stable energy supplies to meet the needs of both the people and the economy. However, following the breakup of the Soviet Union this mechanism came under pressure from emergent geopolitical and economic challenges such as the monetization of energy trade (oil products, gas and electricity) and tensions between domestic water and energy needs. Since the Central Asian energy sectors were initially designed to operate within a unified system, the management of such highly interdependent entities requires coordinated action by all relevant actors. Central Asian states' particular energy policies, which stress self-reliance and self-control, threaten the overall security of the CAES.

The study suggests that the insecurity of the CAES can be most efficiently addressed through reinstating intra-Central Asian energy trade. The sustainability of the CAES, however, requires an effective regional energy governance mechanism. This research analyzes factors affecting the extent of multilateral cooperation in the gas and electric power sectors among Central Asian countries and with external customers within the framework of the stag-hunt game. Most importantly, it explores the potential collective benefits of, and major challenges for governance innovations to, improving security of the CAES within such institutions and programs as (a) the Central Asian Regional Economic Cooperation, (b) the Eurasian Economic Union, (c) the Shanghai Cooperation Organization, (d) the Commonwealth of Independent States, (e) the Central Asian Water–Energy Development Program promoted by the World Bank, and (f) the Regional Environmental Centres for Central Asia.

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List of Abbreviations

ADB	Asian Development Bank
CAC	Central Asia Center
CAES	Central Asian energy system
CAEWDP	Central Asia Energy–Water Development Program
CAGP	Central Asia–China gas pipeline
CAI	Central Asian Initiative on Sustainable Development
CAPS	Central Asian (Electric) Power System
CAREC	The Central Asian Regional Economic Cooperation
CAREC centre	Regional Environmental Center for Central Asia
CASA–1000	Central Asia–South Asia Regional Electricity Trade Project
CASAREM	Central Asia South Asia Regional Electricity Market
CDD	Central Dispatching Departments
CIS	Commonwealth of Independent States
CU	Customs Union
EIA	Energy Information Administration
EEU	Eurasian Economic Union
ESIA	Environmental and Social Impact Assessment
EU	European Union
EurAsEC	Eurasian Economic Community
GDP	Gross Domestic Product
HPP	Hydro-power plant
INGO	International non-governmental organization
NGO	Non-governmental organization
PD	Prisoner’s dilemma
PSA	Product-sharing agreement
RES	Renewable energy sources
SH	Stag-hunt
SES	Single Economic Space
TAPI	Turkmenistan–Afghanistan–Pakistan–India
TEAS	Techno–Economic Assessment study
TPP	Thermal power plants
UNDP	United Nations Development Programme

INTRODUCTION

The Central Asian energy system (CAES), a complex network of gas pipelines and electric power grids, was designed and built during the Soviet period, when political/administrative borders and sovereignty issues were not obstacles to coordinated operation of national energy sectors. The resource-sharing mechanism of the CAES ensured reliable and stable energy supplies to meet both population and economic needs, even after the disintegration of the Soviet Union. Hydrocarbons-producing Kazakhstan, Turkmenistan, and Uzbekistan provided a continuous supply of oil products and natural gas, as well as thermal electricity to the neighbouring upstream Tajikistan and Kyrgyzstan. Tajikistan and Kyrgyzstan, in return, released the required amount of water for irrigation purposes and exported hydroelectricity to downstream countries in the summer. While downstream countries, within the resource-sharing mechanism, were primarily interested in water release, huge hydro-power potential of upstream neighbours' also provided some prospects for increasing the share of clean and renewable energy sources in the overall consumption balance. However, new geopolitical and economic challenges—such as the monetization of the energy trade (oil products, gas and electricity) while preserving water sharing interactions, increasing energy export capacity to external markets at the expense of domestic and intra-Central Asian consumption, the shift from water to energy operation mode of the hydro-power sector—began to strain the mechanism. As a result, the CAES has changed. State actors now pursue divergent energy policies, negatively affecting the security of energy supplies within the region.

Central Asian countries' energy sectors were initially designed to operate within a unified energy system. Management of highly interdependent Central Asian energy sectors required coordinated actions to be taken by all parties involved. Even though there is no longer a

supranational body controlling coordinated operation of these sectors, Central Asian countries, to a varying extent, still remain dependent on each other in ensuring their energy security and energy led economic growth as well as mutually beneficial water management. Within such interdependence the importance of using regional level approach, to studying energy security challenges that Central Asian countries are facing and searching for possibilities to overcome them, should not be underestimated.

Central Asia enjoys an abundance of energy resources capable of ensuring sufficient energy supplies for intraregional consumption and, to some extent, meeting external demand by major customers such as Russia, China, India, and the European Union. While competing energy interests of these powers may affect their own geopolitical and economic gains, it is the impact of these competing interests on the level of energy security that poses threat to the security of the CAES. The external demand for Central Asian resources, along with obligations by regional producers to meet the volume of expected energy supplies, is growing faster than the energy-production capacity of the region. The temptation of revenues from exporting large quantities of energy to external markets, on the one hand, and the inability to unilaterally redirect energy supplies due to asymmetry in power balance, on the other, force Central Asian producers to increase the volume of exports even at the expense of domestic and intra-Central Asian energy consumption. Limited availability of energy resources within the region resulted in escalation of tensions over the construction of large hydro-power plants, disputes over the price for fossil fuels and unstable energy supplies. Asymmetrical interdependence among energy actors and strategic interests in states' energy export/import relations mean that energy resources are used for purposes other than to ensure energy security in Central Asia, thus causing frequent energy supply disruptions, especially when it is needed the most (the winter period).

Statement of the Problem

There are three interlinked pillars of a secure CAES: energy security, regional energy cooperation/trade, and an effective enforcement mechanism. During the Soviet period, the energy security of the Central Asian region was ensured through intraregional cooperation regulated by a supranational administrative body. In the 1990s, parallel operation of energy systems within the framework of the resource-sharing mechanism under the condition of mutual trust secured the sufficiency of energy supplies within the region. Currently, however, the absence of a resource-sharing mechanism has affected the level of cooperation in the energy sector within Central Asia, leading to greater energy insecurity. Isolationist energy policies, both in terms of full self-reliance and self-control, without the establishment of self-sustaining independent energy systems threaten the security of the CAES, in which everyone's energy security interests are supposed to be met simultaneously. Without regional-level energy governance innovations, however, restoring and sustaining cooperative dynamics within the CAES seem to be problematic.

Designed to operate within a unified energy system, the Central Asian energy sectors were regulated from Tashkent and controlled by Moscow. After gaining independence, Central Asian governments reached a common understanding regarding the benefits of sustaining close regional energy cooperation. Interestingly, however, these same governments later started pursuing policies that distanced countries from each other, leading to the disintegration of the CAES. An attempt to break an interdependent system into separate entities (national energy systems) has, to varying extents, affected the level of energy security in all five countries. Energy security can thus be most efficiently addressed through increasing the intra-Central Asian energy trade and greater regional cooperation. Several governance innovations (regional-level energy

governance mechanisms established after the collapse of the Soviet unified energy management system to respond to the energy security challenges) were designed to promote regional cooperation in the energy sector in Central Asia, with the expectation that they would contribute to improving the level of energy security in the region.

In this research work, I ask the following main research question: what governance innovations, if any, offer the best prospects for achieving security of the CAES? To answer the main question, however, it is important to find out why governance innovations became necessary in the first place by asking a secondary question: why is the CAES in the process of disintegration despite the fact that everyone is worse off as a result of the breakdown?

The purpose of this research is to study non-cooperative dynamics within the CAES that have negatively affected the level of energy security and regional-level energy governance innovations to address energy security challenges in Central Asia. More specifically, this work examines whether innovative (energy) governance mechanisms possess powerful instruments to encourage Central Asian states to fulfill their commitments to ensure the stability of energy supplies within the region. And whether such governance mechanisms establish particular relationships between states in which sacrificing some of their political and economic interests would still be better than non-compliance with the terms of energy-trading arrangements.

Exploring the compatibility of Central Asian states' energy policies to ensure the security of the CAES as well as external factors affecting intra-Central Asian energy trade is both timely and important. Newly signed gas supply agreements between China and Central Asian countries almost doubled the volume of gas to be exported to China, thus forcing regional producers to increase export capacity, even at the expense of domestic and intraregional consumption. Recent critical drops of water levels in reservoirs and severe energy insecurity caused by energy supply

cuts from downstream neighbours forced Central Asian upstream countries to promote their giant hydro-power plant (HPP) projects. In its final assessment for the Rogun HPP in Tajikistan, which found that a 335m high dam is economically the most efficient with acceptable environmental and social impacts, the World Bank practically gave a green light to Tajik authorities to pursue the construction of the project, which is capable of affecting the water-energy balance in the region. Uzbekistan opposes construction of large dams, because it fears that its upstream neighbours could interfere with the water supply necessary for the downstream irrigation and particularly cotton industry, upon which Uzbek economy is highly dependent. Fundamental disagreements between the region's demand for water for irrigation and the use of water to generate electricity, along with disputes over the price for fossil fuels and energy trade, can seriously escalate the conflict between upstream and downstream countries.

By identifying the roots of the major energy security challenges preventing intra-Central Asian energy cooperation/trade, and the major weaknesses of existing regional energy governance mechanisms, this research work aims to contribute to the broader literature on energy governance and conflictive/cooperative dynamics of interaction in the strategically important energy sector. While most of the literature focuses on explaining why actors fail to achieve greater levels of cooperation, this particular work focuses on conditions in which—despite a long history of mutually beneficial cooperation—regional actors suddenly decided to pursue myopically self-interested energy policies. The governance of the CAES represents a unique case in which energy security, provided by a highly authoritative supra-national management system—later replaced by cooperative relationships based solely on trust—now faces serious challenges, despite the fact that six main regional-level energy governance mechanisms were put in place to deal with insecurity of the unified system. By identifying the major drawbacks of

energy governance innovations, policy makers would be able to use the knowledge to address these shortcomings to make better decisions and improve energy policies that prioritize regional cooperation and intra-Central Asian energy trade.

This dissertation is organized as follows. The introduction presents the problem statement, methods used for data collection, and theoretical framework that can best map non-cooperative dynamics in the energy sector in Central Asia. Chapter I looks at broader literature explaining the evolution of the energy security concept, major energy security threats, and possible solutions to challenges affecting the sufficiency and sustainability of energy supplies while taking into account specific characteristics of the Central Asian region. Chapter II, “Major Energy Security Concerns and Energy (Security) Policy Priorities of the Central Asian Countries,” assesses the level of energy security in Central Asia and analyzes the compatibility of regional state actors’ competing energy policy priorities to sustain regional cooperation in the energy sector. Chapter III, “Security of the Central Asian Energy (Gas and Electric Power) Systems,” studies conflictive and cooperative dynamics of natural gas and electricity supply relations within the Central Asian region and between regional exporters and external customers. Chapter IV, “Central Asian Energy Security through Regional Cooperation and Energy Trade,” highlights the direct contribution of intraregional energy cooperation on the level of energy security of the Central Asian states. Chapter V, “Regional Energy Governance Innovations in Central Asia,” studies prospects offered by governance innovations in the energy sector and major weaknesses limiting their contribution to improving security of the CAES. The concluding chapter explains the changing power dynamics affecting regional actors’ ability to coordinate their actions to achieve a maximally secure CAES. It summarizes the major challenges preventing regional-level energy governance innovations from ensuring greater energy security

in Central Asia. This section ends with several practical recommendations to reinstate energy trade and facilitate cooperation in the energy sector in Central Asia.

Method

This dissertation draws on both qualitative and quantitative research. Based on the analysis of primary (government publications, state agencies' websites, official speeches, reports and statistical data) and secondary sources as well as extended semi-structured expert interviews, this research work analyzes the level of energy insecurity, the main factors preventing Central Asian state actors from achieving greater cooperation in the energy sector, and the prospects—as well as challenges—that the regional energy governance innovations face in achieving a maximally secure CAES.

A modified set of criteria developed by Vlado Vivoda was chosen to assess Central Asian countries' level of energy security. It contains a comprehensive list of measurement criteria (supply and demand security, economic, environmental, political/security, and technological), and also includes a policy dimension, which is important for the evaluation of Central Asian countries' capability to respond to energy security challenges. Analysis of the regional state actors' energy policies is useful to understand the extent to which governments prioritize regional energy cooperation and are willing to promote governance innovations to sustain such cooperation.

Information for the assessment was primarily collected from databases such as the International Energy Agency (www.iea.org), US Energy Information Administration (EIA) (www.eia.gov) and the World Bank (www.worldbank.org), which provide information for all countries simultaneously. The latest available statistical data for the Central Asian region in

these sources is dated 2012–2013; however, given that there has been no energy production boom, technological development leap, or major energy crises since then, those statistics mostly reflect the current situation.

Since Central Asian governments have not adopted energy strategies highlighting energy security policy priorities, in an attempt to determine state actors' priority areas in the energy sector development, I have analyzed information provided in a number of governmental portals and state agencies' official websites, including:

- Kazakhstan—(former) Ministry of Oil and Gas website (www.mgm.kz), (former) Ministry of Industry and New Technologies (www.mint.kz), Government of Kazakhstan official website (www.government.kz);
- Kyrgyzstan—Government of Kyrgyz Republic official website (www.gov.kg);
- Tajikistan—President of the Republic of Tajikistan official website (www.prezident.tj), Ministry of Foreign Affairs of the Republic of Tajikistan (www.mfa.tj), Ministry of Energy and Industry of the Republic of Tajikistan (www.minenergoprom.tj);
- Turkmenistan—Government of Turkmenistan official website (www.turkmenistan.gov.tm); Turkmen state information agency (www.tdh.gov.tm), Ministry of Oil Industry and Mineral Resources of Turkmenistan (www.minenergo.gov.tm); and
- Uzbekistan—Government of Uzbekistan official website (www.gov.uz), Uzbekneftegaz (www.ung.uz), Ministry of Foreign Economic Relations, Investments and Trade of the Republic of Uzbekistan (www.mfer.uz).

Semi-structured expert interviews with state officials, representatives of non-governmental organizations and experts in the areas of energy, economics, policy development,

and security from Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan were used for the analysis of the cooperative/conflictive dynamics among Central Asian countries in the energy sector.

Reports and statistical data provided by the multilateral institutions as well as regional programs, including the Central Asian Regional Economic Cooperation (www.carecprogram.org), the Shanghai Cooperation Organization (www.secsco.org and www.sco-ec.gov), the Eurasian Economic Union (www.evrazes.com and www.eurasiancommission.org), the Commonwealth of Independent States (www.e-cis.info and www.cis.minsk.by), the World Bank-promoted regional energy governance projects (www.worldbank.org), and the Regional Environmental Center for Central Asia (www.carecnet.org), intended to improve energy security in Central Asia and promote energy-led economic development in the region, were particularly useful to studying regional energy governance innovations.

There were no linguistic limitations to conducting interviews and a systemic literature review on the Central Asian region since I am fluent in most of the languages used in the region (Uzbek, Tajik, Russian and English). There were, however, some limitations of data gathering. Access to some important information was restricted (for example, detailed information concerning the current status of pipeline projects, pricing policy, originals of energy export-import contracts). Asking relevant questions to interviewees and studying reports of regional programs in energy sector and secondary literature compensated for insufficient access to certain data. This information is used to study cooperative and conflictive dynamics of Central Asian energy actors within the framework of the rational game.

Theoretical Framework

After operating within the common energy system for a long time, Central Asian countries seem to have reoriented their energy policies toward establishing independent, both separately regulated/administered as well as unconnected, national energy systems, causing disintegration of the CAES. Governments of the Central Asian countries have a decisive role in almost all areas of domestic and foreign relations, including cooperation in the energy sector, and are often blamed for the decreasing level of cooperation, consequently resulting in a lower level of energy security in the region. Thus, I offer a rational-actor explanation for the ongoing disintegration of the CAES without claiming that there are no other possible explanations. This research work studies the extent of a function of the rational pursuit of individual states' self-interests (economic and political gains as well as certain energy security concerns) that is negatively affecting intraregional cooperation, consequently leading to greater energy insecurity in Central Asia. The most important question, however, is whether cooperation in the energy sector between regional state actors is currently, and overall, less preferred to individual gains that Central Asian countries can hypothetically achieve or if it is simply a problem of coordination that is preventing these actors from gaining the highest possible rewards. The prisoner's dilemma (PD) game, in which actors fail to cooperate because there is high incentive for players to cheat in an environment of uncertainty, and the stag-hunt (SH) model, which explains the problem of coordination of common strategy to achieve a big payoff, are good frameworks through which to map the energy security challenges of the CAES.

The Prisoner's Dilemma Game

Actors behave rationally when they choose the most preferred outcome out of several alternatives.¹ The PD is a cooperation game, in which the main concern is how to get the players to cooperate when there are high incentives to cheat. If an actor has no confidence that the other will not cheat or will simply be tempted by the fact that he or she may gain the most by defecting, cooperation will most definitely fail.

	Cooperate	Defect
Cooperate	(R) 2, 2	(S, T) 0, 3
Defect	(T, S) 3, 0	(P) 1, 1

(2, 2) represents the reward that players can receive for choosing to cooperate. Zero is what the player who cooperated while others defected gets. Under the condition that a player defects and others do not he or she can get the highest possible payoff of 3. If everyone fails to cooperate, players are punished by receiving only some rewards represented by (1, 1) in the table. This, however, is less than what they can achieve in cases they both choose not to cheat. The formula explaining the PD has to satisfy the following inequalities:

$$(S) 0 < (P) 1 < (R) 2 < (T) 3$$

Hypothetically, cooperation should be preferred to defection because the total reward players get is higher than any other outcome:

$$2+2 > 0+3/3+0/1+1$$

¹ Stephen Quackenbush, "The Rationality of Rational Choice Theory," *International Interactions* (2004): 95, doi:10.1080/03050620490462595.

Players, however, may still choose to cheat on others, seeking the highest possible individual payoff (3) they can get in an environment of uncertainty and lack of trust.² The easiest way to explain the joint defection outcome in PD is to say that no matter what the other player does, one is better off defecting.

In the PD, players do not take moral considerations into account. Actors do not fear possible moral revenge from others for their actions.³ They are, however, concerned about the same type of defection by other players (tit-for-tat), which affect their payoff. Defection may not always be determined by a strong desire to cheat, but might be instigated by a simple lack of knowledge and trust. “If each player is rational and knows that the other is rational, but neither knows that the other knows that he is rational, then nobody is cheated, but everybody has an interest in acting as if he were being cheated,” argues Cristina Bicchieri.⁴ Alternatively, to one-shot tit-for-tat strategy, Pavlov presents the win–stay, lose–shift fundamental behavioural mechanism. After a round of mutual defection caused by tit-for-tat, players will most likely choose to return to joint cooperation and stick to it.⁵ Similarly, while the main problem in PD is the mistrust among players, if players are rational and playing iterated PD, then according to Robert M. Axelrod, cooperation will emerge organically. Encouraging cooperation and resolution of conflict depends on four conditions: “avoiding unnecessary conflict by cooperating when the other player cooperates, retaliating for unprovoked defection, forgiveness after retaliating, and clarity of behaviour, allowing the other player to adapt to one's pattern of

² Anatol Rapoport, Albert M. Chammah, and Carol J. Orwant, *A Study in Conflict and Cooperation* (Ann Arbor: University of Michigan Press, 1965), 34.

³ Michael P. Marks, “The Prison as Metaphor: Recasting the ‘Dilemma’ of International Relations,” *Alternatives: Global, Local, Political* 26, no. 3 (July/August 2001): 363.

⁴ Cristina Bicchieri, Richard C. Jeffrey, and Brian Skyrms, *The Dynamics of Norms* (Cambridge: Cambridge University Press, 1997), 222.

⁵ Martin Nowak and Karl Sigmund, “A Strategy of Win-stay, Lose-shift That Outperforms Tit-for-Tat in the PD Game,” *Nature* 364 (July 1993): 56, doi:10.1038/364056a0.

behaviour.”⁶ However, since the CAES is still in the process of disintegration, and despite several rounds of defection, regional state actors have not shown any sign of cooperative dynamics, we can dismiss the PD game as the main device to study the problem of regional cooperation in the energy sector.

The Stag-Hunt Game

If the PD (cooperation game) is about a high incentive to cheat and mistrust, which results in a lack of cooperation, the SH game is better understood as a coordination game. In other words, SH is about getting players to coordinate a common strategy to get the big payoff—the stag.⁷ The SH satisfies the following equation:

$$(R) 2 > (T) 1 > (P) 1 > (S) 0$$

If a stag appears right in the beginning of hunting, hunters would most definitely go after it and enjoy the highest possible gains. But the stag rarely appears in the beginning of hunting, which requires certain patience from all hunters. Waiting for a stag to show up may take some time testing hunters’ true commitment to the common cause and trust among each other. The most challenging part of prolonged stag hunting is to make sure that hunters would not defect when a hare emerges from the bush. If any of the hunters shoots the hare, the noise would scare the stag in the area. The hunter that chooses to defect can have sufficient meat today, but would get hungry again tomorrow, like the others.⁸

⁶ Robert M. Axelrod and St. D. Hamilton, *The Evolution of Cooperation* (New York: Basic Books, 1984), in Curtis S. Signorino, “Simulating International Cooperation Under Uncertainty,” *The Journal of Conflict Resolution* 40, no. 1 (March 1996): 154.

⁷ Robert Kelly, “The Six-Party Talks as a Game Theoretic ‘Stag-Hunt’ (1): N. Korea is the Stag,” *Asian Security Blog*, April 26, 2010, accessed January 29, 2014, <https://asiansecurityblog.wordpress.com/2010/04/29/the-six-party-talks-as-a-game-theoretic-Stag-hunt-2-china-likes-the-rabbit-too-much/>.

⁸ Walter C Clemens, *Dynamics of International Relations: Conflict and Mutual Gain in an Era of Global Interdependence* (Lanham, MD: Rowman & Littlefield Publishers, 2004), 211.

The dilemma in the SH game is whether to go after the smaller hare with promising chances of catching it, or risk ending up with nothing in order to increase the chance of catching the stag.⁹ A hunter who chooses to go for a stag takes a risk that others may choose not to. A hunter that goes for a hare runs no such risk, because his payoff does not depend on others. But he sacrifices the potential gains in case of a successful SH.¹⁰ In this regard, players have to make a difficult choice of whether to achieve selfish gains immediately with lower risks, or collective benefits in the long term running some risk of losing everything.¹¹ There should be two conditions that would encourage hunters to go for a stag: guarantee that others would not defect; and the fact that hunters gain more by hunting a stag than if they separately capture all possible hares.

	Stag (cooperate)	Hare (defect)
Stag (cooperate)	(R) 2, 2	(S, T) 0, 1
Hare (defect)	(T, S) 1, 0	(P) 1, 1

In the PD game, achieving cooperation with fewer players may seem to have a greater chance of realization, because there is no need to try to calculate the intentions of many actors in an environment of uncertainty. While in the PD the larger the group, the more difficult it is to achieve cooperation, conversely in the SH it would be quite challenging to hunt a stag with two participants. A higher number of participants increase the chance to hunt a stag. Differently

⁹ Jack Donnelly, *Realism and International Relations* (Cambridge [England]: Cambridge University Press, 2000), 152.

¹⁰ Brian Skyrms and U. C. Irvine, "The Stag Hunt," *Pacific Division of the American Philosophical Association*, March 2001, accessed February 6, 2014, <http://www.socsci.uci.edu/~bskyrms/bio/papers/StagHunt.pdf>.

¹¹ Pushpesh Pant, *International Relations in 21st Century* (India: Tata McGraw-Hill Education, 2011), 35.

from the PD, in the SH there is a cooperative equilibrium where if others cooperate the player has to do his or her part as well.¹² Robert Pahre believes that one of the most effective mechanisms for sustaining multilateralism is asymmetric enforcement. Large enforcers of small cheaters will provide basis for multilateral cooperation.¹³ An asymmetrical power balance might be an important instrument to sustain multilateral cooperative dynamics, but does not necessarily imply that the interests of all parties are equally secured. Within such relationships, less powerful members are vulnerable to unilateral manipulation from dominant players.

Players may choose selfish gains when they could clearly be better off within collective benefits' distribution, because players prioritize immediate short-term benefits against achieving long-term gains.¹⁴ Stephen J. Majeski and Shane Fricks argue that the role of communication between states and its effect on players' decision to cooperate should not be underestimated. States cooperate more and defect less when they are engaged in communication. Players fail to cooperate because they know little about the others and thus fear them. Communication is a good tool to alleviate that fear. There are two forms of communication. The first form consists of signals. Signals are costly and directly affect the payoffs. In the energy sector, the cost of signals may vary from certain payments necessary to establish a well-functioning energy system to the costs associated with resource wars. The second form of communication is cheap talks. Cheap talks do not bear any cost, but also do not necessarily affect the outcomes of interaction.¹⁵ Communication provides parties with more information and the possibility to better calculate expected choices. Communication can show players that there is little to fear about others and

¹² Jorge M. Pacheco et al., "Evolutionary Dynamics of Collective Action in N-Person Stag Hunt Dilemmas," *Biological Sciences* 276, no. 1655 (January 2009): 315, doi:10.1007/978-3-0348-0122-5_7.

¹³ Robert Pahre, "Multilateral Cooperation in an Iterated PD," *Journal of Conflict Resolution* 38, no. 2 (June 1994): 339.

¹⁴ Robert Axelrod, "The Evolution of Strategies in the Iterated PD," in *The Dynamics of Norms* by Cristina Bicchieri, Richard C. Jeffrey, and Brian Skyrms, (Cambridge: Cambridge University Press, 1997), 222.

¹⁵ Stephen J. Majeski and Shane Fricks, "Conflict And Cooperation in International Relations," *Journal of Conflict Resolution* 39, no. 4 (December 1995): 627, doi:10.1177/0022002795039004002.

that it is a mistake to cheat on each other, thus encouraging greater cooperation, which can bring higher payoffs.¹⁶

This research examines the factors affecting the extent of multilateral cooperation in the energy sector among Central Asian countries and with external customers, as well as the problem of miscommunication that prevents state actors from developing a better coordinated strategy to improve the security of the CAES within the framework of the SH game.

¹⁶ Majeski and Fricks, "Conflict And Cooperation in International Relations," 628.

CHAPTER I. Literature Review: Defining Energy Security, Energy Security Challenges and Solutions

Evolution of the Energy Security Concept

A large amount of work has been conducted on energy security within the framework of national security, economic gains, international politics, energy interdependence and the diversification of energy sources/energy export routes. Various scholars have examined the concept from different angles, but they have failed to produce a universal definition of energy security.¹

One group of scholars argues that energy security is constructed around the recognition that oil, gas, and their renewable counterparts need to be considered first and foremost as commodities. Thus, energy export/import relations are to be exercised through market-based transactions.² Others emphasize the linkage between energy security, international politics, and national security.³ State actors are usually guided by a particular type of logic, suggesting that they cannot trust energy security to market forces alone. Thus, state actors often interpret threats to energy security as threats to national security.⁴ For instance, in choosing routes to export energy, states often consider the political implications of various route options.⁵

There have been two major shifts in the literature in defining the concept of energy

¹ Felix Ciuta, "Conceptual Notes on Energy Security: Total or Banal Security?" *Security Dialogue*, vol. 41, no. 2 (2010): 126, doi:10.1177/0967010610361596.

² Andreas Goldthau and Jan Martin Witte, "From Energy Security to Global Energy Governance," *Journal of Energy Security* (2010), energy-governance&catid=103:energysecurityissuecontent&Itemid=358.

³ Daniel Moran and James A. Russell, *Energy Security and Global Politics: The Militarization of Resource Management* (London: Routledge, 2009); Filippos Proedrou, *EU Energy Security in the Gas Sector Evolving Dynamics, Policy Dilemmas and Prospects* (Aldershot: Ashgate, 2012); Roy Allison and Lena Jonson, *Central Asian Security The New International Context* (London: Royal Institute of International Affairs, 2001); Sascha Müller-Kraenner, *Energy Security: Re-Measuring the World* (London: Earthscan, 2008).

⁴ Moran and Russell, *Energy Security and Global Politics*, 2.

⁵ Brenda Shaffer, *Energy Politics* (Philadelphia: University of Pennsylvania Press, 2009).

security. The first shift is characterized by broadening sources vital to providing energy security. The evaluation of energy security is no longer limited to the security of oil and gas supplies as well as diversification of energy transporting routes and energy markets. Increasing the share of alternative energy sources such as wind, solar, nuclear, and hydro power in the overall energy production balance has become an important aspect of energy security to ensure the long-term security of energy supplies.⁶ Having feared depletion of hydrocarbons and environmental risks associated with excessive usage of fossil fuels forced energy actors to develop renewable energy sources (RES) in the overall energy consumption.⁷ Employment of new technologies to increase efficiency of energy production, storage, and transportation can contribute as much as increasing the production of fossil fuels.⁸

The second shift is about expanding the range of actors whose energy security concerns must be considered. Conventional understanding of energy security emphasizes the importance of energy (mainly oil and gas) supplies for importing countries. As a result, energy security has been associated with energy self-sufficiency and the security of energy supplies. When a country begins importing a large amount of oil and gas, it becomes vulnerable to potential energy sanctions. This compromises its energy security, understood as the security of energy supplies.⁹ “[C]onventional energy security seeks to assure supply while assuming that demand is

⁶ Christian Winzer, “Conceptualizing Energy Security,” *Energy Policy* 46 (2012); Benjamin K. Sovacool, “The Methodological Challenges of Creating a Comprehensive Energy Security Index,” *Energy Policy* 48 (2012); David V. Hippel et al., “Energy Security and Sustainability in Northeast Asia,” *Energy Policy* 39, no. 11 (2011), doi:10.1016/j.enpol.2009.07.001.

⁷ Hippel, “Energy security and Sustainability in Northeast Asia”; Vlado Vivoda, “Evaluating Energy Security in the Asia-Pacific Region: A Novel Methodological Approach,” *Energy Policy* 38 (2010), doi:10.1016/j.enpol.2010.05.028; Winzer, “Conceptualizing Energy Security”; Sovacool, “The Methodological Challenges.”

⁸ International Energy Agency, *Energy Efficiency Governance: Handbook* (Paris: International Energy Agency, 2010): 226, accessed April 7, 2015, http://www.iea.org/publications/freepublications/publication/gov_handbook-1.pdf.

⁹ Michael Wesley, *Energy Security in Asia* (New York, NY: Routledge, 2007), 43.

given [...].”¹⁰

Recent studies on energy security have shifted the definition of energy security from a sole focus on the importers’ perspective to the relationship between energy importers and exporters, thus emphasizing the vulnerability of the latter in energy export/import relations. The main line of argument is that “exporters worry about energy demand the way energy importers worry about energy supply.”¹¹ Energy security, from the exporters’ perspective, is defined as the security of demand to generate economic growth and to maintain social stability,¹² which can be threatened by a variety of factors, such as resource wars or economic sanctions imposed by importing states.¹³

The most recent approach to energy security places individuals’ energy needs at the centre of interest because an abundance of energy resources in a country does not necessarily mean that individuals are continuously provided with sufficient energy.¹⁴ The human dimension of energy security, or the so-called “energy services security,” places individuals at the centre of interest in designing energy policy and emphasizes individuals’ access to energy resources in sufficient volume at an affordable price.¹⁵

Energy Security Threats

While some associate the availability of energy with massive deposits of natural resources, what happens above ground is more likely to impact the level of energy security than

¹⁰ Vivoda, “Evaluating Energy Security.”

¹¹ Gawdat Bahgat, *Energy Security: An Interdisciplinary Approach* (Chichester, West Sussex, U.K.: Wiley, 2011), 226.

¹² Daniel Yergin, *The Quest: Energy, Security and the Remaking of the Modern World* (New York: Penguin Press, 2011), 267.

¹³ Allison and Jonson, *Central Asian Security*.

¹⁴ Shaffer, *Energy Politics*, 91; Stefan Buzar, *Energy Poverty in Eastern Europe: Hidden Geographies of Deprivation* (Burlington, VT: Ashgate, 2007).

¹⁵ Anas F. Alhaji, “What Is Energy Security? Definitions and Concepts (Part 3/5),” *Middle East Economic Survey* 50, no. 45 (2007), accessed September 20, 2011, <http://archives.mees.com/issues/213/articles/8255>.

what is available underground.¹⁶ Natural resources lying underground have no intrinsic value to ensure availability of energy for both economic and population needs. Energy resources acquire such value when they are extracted and transported to energy markets.¹⁷ However, the list of factors that can threaten the security of energy supply is quite inclusive: “internal instability, civil wars, ethnic violence that can disturb energy production; terroristic attacks on energy infrastructure; politically motivated suspension of oil and gas supply; economic sanctions against energy producing countries; war between energy producers; territorial disputes that can significantly slow down cooperation among parties in the energy sector and so on.”¹⁸ The list can be extended to underinvestment in the development of RES, improving efficiency of energy production, transportation and consumption facilities, as well as non-market mechanisms regulating the energy sector.

Energy Infrastructure Insecurity

Energy security threats in relation to infrastructure vary depending on energy transportation means. For a landlocked region, pipelines are the most cost-efficient way of transporting resources. However, oil and gas pipelines often run over long distances through sparsely populated and therefore only poorly guarded territory. Once damage has been done, it often takes considerable time until the status quo is restored.¹⁹ Some scholars argue that terrorists have little incentive to attack energy supply infrastructure. Because attacks can be costly but very limited in terms of casualties, striking energy infrastructure possesses a relatively low symbolic meaning across terrorist ideologies and attacks on energy transmission

¹⁶ Bahgat, *Energy Security*, 16.

¹⁷ George Joffe, “Threats to Energy Security,” *Center for International Studies University of Cambridge* (n.d.), 12.

¹⁸ Bahgat, *Energy Security*, 15.

¹⁹ Muller-Kraenner, *Energy Security*, 23.

infrastructure can diminish the support of a terrorist group by the wider population.²⁰ Others believe that since energy infrastructures are often strategically important for sustaining political regimes, they are quite vulnerable to terrorist or insurgent attacks.

Militarization of Energy Resources

Pipeline infrastructure projects link states and reflect relations. In choosing routes to export energy, states naturally consider the political ramifications of various route options. Brenda Shaffer lists 19 points in which energy and international politics interlink. The main point is that energy and politics are inseparable and they affect each other all the time. Among many aspects of the energy-politics nexus, she highlights “peace pipelines,” interdependence between supplier and consumer, the power of transit countries to affect energy relations, resource wars, the physical vulnerability of the energy trade, and the threat of climate change.²¹ Daniel Moran and James A. Russell argue that energy security is central to national security and that threats to the former are liable to be reflexively interpreted as threats to the latter.²² Scholars claim that the militarization of energy—resource management such as the direct seizure of energy assets by military means, destruction of energy assets to deny their use to rivals, military protection of, or attacks upon the energy production and transportation infrastructure, including oil fields, refineries, pipelines, and so on—may occur due to national security reasons.²³ A legacy of suspicion, mistrust, tensions among ethnic groups and political parochialism can escalate a conflict over the control of and access to natural resources.²⁴

²⁰ Peter Toft, Arash Duero and Arunas Bieliauskas, “Terrorist Targeting and Energy Security,” *Energy Policy* 38, no. 8 (2010): 4416, doi:10.1016/j.enpol.2010.03.070.

²¹ Shaffer, *Energy Politics*, 6.

²² Moran and Russell, *Energy Security and Global Politics*, 2.

²³ *Ibid.*, 7.

²⁴ Charles K Ebinger, *Energy and Security in South Asia Cooperation or Conflict?* (Washington, D.C.: Brookings Institution Press, 2011), ix.

Despite Saddam Hussein's promise not to take aggressive actions against Kuwait, which started drilling too much oil, causing the oil price to go down, he started a war against Kuwait in 1990.²⁵ Iraqi soldiers destroyed many oil fields in Kuwait to destabilize the export system of the country. The logic of war in energy security implies that "energy is a security issue because it is either a cause or an instrument of war or conflict."²⁶ From the geopolitical perspective, consumer states may decide to intervene to ensure the security of supply if conditions inside producing countries threaten the supply flows.²⁷ There have been a few such cases in the past: the 1951–1953 crisis in Iran, the 1991 intervention over Kuwait, and the 2003 intervention in Iraq.²⁸

The Energy Weapon

Although hypothetically both importers and exporters are interested in stable and reliable energy markets, this stability can sometimes be sacrificed for purposes other than to ensure energy security. While states usually refrain from engaging in war over resources, energy actors often employ less radical means to pursue their national interests to get access to energy or to use energy leverage to achieve goals in other areas of activity. Economic sanctions against Iran and gas export disruptions from Turkmenistan to Russia show that both importing countries and exporting can be exposed to the threat of "energy weapon."²⁹ Oil and gas markets in which pipelines are the main means of transportation may seem to be less vulnerable to the manipulation of both price and production, because export/import relations are based on long-

²⁵ Yergin, *The Quest*, 9.

²⁶ Ciuta, "Conceptual Notes on Energy Security," 129.

²⁷ Joffe, "Threats to Energy Security," 9.

²⁸ Ibid., 17.

²⁹ Shaffer, *Energy Politics*, 1.

term contracts.³⁰ Yet such agreements are sometimes incapable of securing the energy markets and stable supply relations from short-term energy crises. Since there is no universal regulatory mechanism, and it is difficult to come to agreement concerning profit and rent-sharing, price manipulation may take place in the relationships between parties, especially if they are asymmetrically dependent on each other.³¹

Increasing Export at the Expense of Domestic Consumption

Building energy infrastructure requires significant upfront investments. With direct interest in importing energy, consumers often take part in projects designed to extract and transport resources. Once invested, consuming states seek to ensure that their investments are protected and they receive the expected volume of resources.³² There is, however, often a conflict of interests in which, on the one hand, investors (customers) are interested in acquiring energy while, on the other hand, it may affect availability of energy for domestic needs if the overall production capacity is limited. If they are tempted by revenues from exporting resources, energy producers may increase the volume of export, even at the expense of domestic consumption.

The Problem of Sustainability of Energy Sectors

Some challenges are not perceived by state actors as a threat per se right now, but would most likely have a negative effect on energy security in the long run. Very often, state actors' perception of energy security is limited to ensuring the highest possible price for exporters' oil and gas and securing continuous supplies of hydrocarbons for importing countries through the

³⁰ Joffe, "Threats to Energy Security," 8.

³¹ Paul Stevens, *Transit Troubles: Pipelines As a Source of Conflict* (London: Chatham House, 2009).

³² Shaffer, *Energy Politics*, 52.

diversification of energy supply routes.³³ The reason for such a limited understanding of energy security is that states are interested in promoting one aspect of energy security more than others.³⁴ However, it is impossible to address the complex set of energy security issues by having just one part of it in mind.³⁵ Equating energy security to the stability of energy supplies would mean that in the best-case scenario, oil and gas supplies security is ensured. Long-term energy security, however, requires the development of alternative energy sources.

Lack of Energy Security Policy

For exporting countries, moving energy out to external markets does not contribute to their energy security in terms of availability of resources for domestic consumption. Energy sectors dominated by market mechanisms can naturally eliminate the difference between domestic and external energy prices, thus increasing the attractiveness of exporters' internal markets. However, the development of energy sectors extensively controlled and subsidized by state actors requires government policies that are specifically adopted to ensure energy security. In this case, lack of attention by state actors toward developing alternative energy sources and inability to coordinate their policies with other energy actors to increase efficiency of energy production and transportation by employing new technologies significantly weakens the security of the energy system. The development of the energy sector in various directions, however, requires clearly defined but also quite flexible (responsive to emerging energy security threats) energy security policy/strategy. According to Vivoda, "if a state does not have a clearly stated energy security policy, which addresses in detail, the traditional and new energy security

³³ Gawdat Bahgat, "Central Asia and Energy Security," *Asian Affairs* 38, no. 1 (2006), doi:10.1080/03068370500456819.

³⁴ Shaffer, *Energy Politics*, 93.

³⁵ Hippel, "Energy Security and Sustainability"; Sovacool, "The Methodological Challenges."

challenges, this allows that this state may not have the capacity and/or commitment to [timely and adequately] ensure energy security.”³⁶

System-level Energy Security and Asymmetrical Interdependence

There are indeed many factors affecting energy security at the local, state, and international levels. What is equally important, however, is that threats at one particular level can and usually do affect energy security at the other. Consequently, as Barry Buzan rightfully puts it, [energy] security at the local level is closely interlinked to security at the state and international system levels and the other way around.³⁷

At the international level, energy security threats usually emerge as a result of interstate relations, in which they interact with each other, and impact their overall security.³⁸ Daniel Yergin considers energy security as a system “composed of the national policies and international institutions that are designed to respond in a coordinated way to energy supply disruptions.”³⁹ The ways states interact with each other often depends on changes in the regional balance of power or as a result of change in historical amity and enmity patterns. Most of the projects/initiatives in the energy sector do not change the distribution of power or enmity patterns retaining the status quo in relations. Some projects, however, may cause tensions, leading to the break up of the existing security complex. There are also cases when new energy actors move into the complex (external transformation) and significantly change the existing

³⁶ Vivoda, “Evaluating Energy Security,” 5259.

³⁷ Barry Buzan, “Peace, Power, and Security: Contending Concepts in the Study of International Relations,” *Journal of Peace Research* 21, no.2 (1984): 121.

³⁸ Yergin, *The Quest*, 264.

³⁹ *Ibid.*, 267.

power balance (overlay).⁴⁰ Many scholars argue that mutually beneficial power balance in energy supply relations is maintained when engaging parties are interdependent.

Importing states are interested in getting access to energy resources. Exporters are driven by the desire to generate revenues from moving energy out to external markets. The role of a so-called “good transit country,” which tends to produce predictable conditions for the most cost-efficient transportation of energy to consumers with minimal disruptions and has internal security and stable government, is also crucial.⁴¹ Robert Jackson and Georg Sørensen argue that interdependence between producers and transit countries may produce incentives to avoid conflicts and compel states to engage in more intensive forms of cooperation.⁴²

However, if relationships are not based on confidence, then high interdependence may be seen as a negative factor. Mutually dependent states are rarely equally or symmetrically dependent on each other. Taking into account the fact that the less dependent state in energy-supply relations is the one for which the termination or drastic alteration of the relationship in supply chain costs least, it may use its power to manipulate the relationships to achieve leverage not only in the specific issue area (energy sector), but also in various areas of general interaction affected by spillover effects (broader political and economic spheres). According to Robert O. Keohane and Joseph S. Nye, “an unequal distribution of gains and expenses lies at the heart of asymmetrical interdependence,” which can incentivize or force least-privileged actors to defect, causing the conflict.⁴³ Asymmetrical interdependence can be as dangerous as dependence itself.

⁴⁰ Barry Buzan, Ole Waever and Jaap de Wilde, *Security: A New Framework for Analysis* (Boulder [u.a.]: Rienner, 1998), 13-14.

⁴¹ Stevens, *Transit Troubles Pipelines*, 11.

⁴² Robert St. Jackson and Georg Sørensen, *Introduction to International Relations: Theories and Approaches* (Oxford: Oxford University Press, 2007), 100–115.

⁴³ Robert O. Keohane and Joseph S. Nye, *Power and Interdependence: World Politics in Transition* (Boston: Little, Brown, 2001), 9.

The key aspect of asymmetrical interdependence is the power capacity of one country to direct the decisions and actions of another state or states.⁴⁴ However, sometimes it is not actual dependence, but the overall relationships among actors that matter the most. The state with friendly relations to another state might not consider 50 percent energy dependency as a security challenge and would further develop joint cooperation, while two states with relatively opposed relations might perceive even 10 percent dependency as a serious obstacle to developing further relations. Moreover, interacting parties often try to minimize their dependence on others and at the same time increase others' dependence on them.⁴⁵

An issue of interdependence that generates conflicts is highly sensitive when it comes to pipeline transit infrastructure. Energy transit infrastructure is a very complex network of supply system to the end-user. Transit pipelines have a tendency to produce long- or short-term conflicts or tensions in the relations between producer and transit country as a result of gas transit disruptions.⁴⁶ The fact that a pipeline has to cross the territory of a sovereign country or countries, which in practice has the capacity, although not the right, to unilaterally abrogate any agreement on energy supply, makes the situation quite complicated.

How to Achieve Energy Security?

There is no universal definition of energy security. Thus, the extent and type of energy security threats vary from region to region. The measures needed to address those challenges also vary. While some scholars emphasize diversification of energy sources and suppliers, building strategic storage reserves, establishing country/region-wide energy infrastructure and

⁴⁴ Charles Freeman, *Arts of Power: Statecraft and Diplomacy* (Washington, DC: United States Institute of Peace Press, 1997), 2.

⁴⁵ Paul R. Viotti and Mark V. Kauppi, *International Relations Theory: Realism, Pluralism, Globalism* (New York: Macmillan, 1993), 57.

⁴⁶ Stevens, *Transit Troubles Pipelines*, 1.

flexibility to shift fuels,⁴⁷ others expand the list to include the availability of high-quality and timely information sharing, collaboration among energy actors, investment flows, research, and development.⁴⁸ For a landlocked region, in which energy security is dependent on pipeline and electricity transmission infrastructure, diversification of dependence between energy actors is often perceived as the best way to ensure stability and reliability of energy supplies.

Interdependence through Diversification

A large amount of work has been done on energy security issues and the diversification of consumers' energy dependency within the framework of national security, economic gains, international politics, energy interdependence, and military power.⁴⁹ Shaffer argues that energy security can be provided when suppliers and consumers are interdependent in the supply relations.⁵⁰ The extent to which each side possesses alternative supply or market options, including transport infrastructure, determines the extent of interdependence in energy relations.⁵¹ Diversification of energy export routes ensures alternative ways of transporting energy for consumers (decreases the effect of energy supply disruptions by one actor) and alternative markets for energy producers to sell energy at world prices.⁵² There are a number of different factors that may ensure the success of such diversification, including: geography (distance between exporting and importing countries, security/vulnerability of transport routes), political relations, availability of energy resources and transport infrastructure, refining capacity,

⁴⁷ Shaffer, *Energy Politics*, 93.

⁴⁸ Bahgat, *Energy Security*, 2.

⁴⁹ Shaffer, *Energy Politics*; Goldthau and Witte, "From Energy Security to Global Energy"; Moran and Russel, *Energy Security and Global Politics*; Muller-Kraenner, *Energy Security: re-measuring; etc.*

⁵⁰ Shaffer, *Energy Politics*, 39.

⁵¹ Thrassy N. Marketos, *China's Energy Geopolitics: The Shanghai Cooperation Organization and Central Asia* (Abingdon, Oxon: Routledge, 2009).

⁵² Vaclav Hubinger, "Southern Corridor: A Strategy for Sustainable Energy Cooperation with Central Asia," *EUCAM Watch*, no. 4 (2009), accessed June 1, 2014, http://www.fride.org/download/EUCAM_Newletter4_ENG_may09.pdf.

policy (commitment to implement), and resources (capacity and willingness to pay the price to secure access to alternative energy).⁵³

There are other techniques to decrease asymmetry in interdependence and prevent energy supply disruptions. One of the possibilities is to build strategic reserves. Strategic petroleum reserves can serve as insurance from very short-term supply disruptions for energy-importing countries.⁵⁴ Such reserves do not solve the problem of prolonged supply disruptions. Another possibility is to bind importers and exporters with a formal agreement.⁵⁵ However, sometimes energy exporters and importers, as well as transit countries, are criticized for using energy as a “weapon” by breaking the terms of contract. Regional energy relations are very often interest-driven and lack an effective enforcement mechanism to respect the contracts. That is why, as Shaffer puts it right, “one of the major components of the cost of a project can be compensating for the perceived risk: regime’s political orientation, how likely it is to respect signed contracts, its propensity to be involved in regional conflict, etc.”⁵⁶

Market Mechanisms

State actors often overemphasize the relationships between energy security and national security. They tend to perceive energy resources as a strategic commodity and are willing to use energy as leverage for purposes other than that to ensure stable and reliable supplies of resources for economic and population needs. Andreas Goldthau and Jan Martin, however, argue that energy security should be constructed around recognition that oil, gas, and their renewable

⁵³ Vlado Vivoda, “Diversification of Oil Import Sources and Energy Security: A Key Strategy or an Elusive Objective?” *Energy Policy* 37 (2009): 4620, doi:10.1016/j.enpol.2009.06.007.

⁵⁴ Yergin, *The Quest*, 271.

⁵⁵ Joffe, “Threats to Energy Security,” 13-14.

⁵⁶ Shaffer, *Energy Politics*, 2.

counterparts need to be considered first and foremost as commodities.⁵⁷ So, for the consumers to access energy resources at fair prices, energy exporters should also exercise their price bargaining power through market-based transactions.⁵⁸

Market mechanisms can provide effective instruments to deal with energy insecurity.⁵⁹ Many energy security experts consider market integration to be the most effective way to ensure energy security.⁶⁰ Among the major advantages of market mechanisms are innovation, flexibility and cost-effectiveness, all of which government agencies often ignore.⁶¹ Non-market mechanisms can also be employed and sometimes might be a necessary condition to address energy security challenges, but only after market mechanisms fail. Governments can take a leading role in addressing suddenly emerging energy security challenges; however, market mechanisms come first, not the other way around. Long-term energy security can be ensured through proper functioning of market mechanisms in combination with government regulatory instruments operating within a free market.⁶² It is quite difficult to establish well-functioning market mechanisms in an environment dominated by unaccountable and non-transparent government institutions.⁶³

⁵⁷ Goldthau and Witte, "From Energy Security to Global Energy Governance."

⁵⁸ Padgett, "External European Union Governance in Energy: Full Research Report," *RES-000-22-2562*, Swindon: ESRC, 2009.

⁵⁹ Filippou Proedrou, *EU Energy Security in the Gas Sector Evolving Dynamics, Policy Dilemmas and Prospects* (Aldershot: Ashgate, 2012), 69.

⁶⁰ Adrian Gheorghe and Liviu Muresan, *Energy Security International and Local Issues, Theoretical Perspectives, and Critical Energy Infrastructures* (Dordrecht: Springer Netherlands, 2011), 14.

⁶¹ Carlos Pascual and Jonathan Elkind, *Energy Security Economics, Politics, Strategies, and Implications* (Washington, DC: Brookings Institution Press, 2010), 279.

⁶² Youngho Chang and Swee Lean Collin Koh, "Rethinking Market Governance and Energy Security," (Chapter 2), 14 in *Energy and Non-Traditional Security (NTS) in Asia*, edited by Mely Caballero Anthony, Youngho Chang, and Nur Azha Putra, Berlin: Springer, 2012 DOI: 10.1007/978-3-642-29706-9_2

⁶³ "Providing Security of Supply Efficiently Using Market Mechanisms. Industry Proposal for a Decentralized Capacity Market," June 2014, 3, accessed March 1, 2015, [https://www.bdew.de/internet.nsf/res/595D1657AAB9ED23C1257D5E00314BAB/\\$file/Branchenvorschlag_fuer_ei_nen_dezentralen_Leistungsmarkt_Kurzbeschreibung_en_final.pdf](https://www.bdew.de/internet.nsf/res/595D1657AAB9ED23C1257D5E00314BAB/$file/Branchenvorschlag_fuer_ei_nen_dezentralen_Leistungsmarkt_Kurzbeschreibung_en_final.pdf).

Governance Mechanisms

Taking into account the evolving nature of energy security threats, it has become difficult for governments alone to adequately address energy security problems.⁶⁴ In some cases, approaching a whole set of energy security challenges might not be in the short-term interests of state actors. A governance approach, on the other hand, provides a mechanism/platform to coordinate state policies to make sure that states take into account the interests of other actors and develop those aspects of energy security that otherwise would barely receive appropriate attention.⁶⁵ In this research work, governance is defined as “the coordinated, polycentric management of issues purposefully directed toward particular outcomes.”⁶⁶ While there can be different political (power dynamics, identity and ideology, internal and external threats, domestic politics, leadership) as well as economic (high level of economic interdependence, trade, the complementarity of economies and policies, a desire to stimulate trade and attract investments through creation of a larger market) factors driving regionalism,⁶⁷ governance mechanisms are an important instrument to sustain cooperative dynamics.

One of the key elements of governance innovations at all levels (local, national, regional and global) of interaction is the ability to facilitate persuasion rather than coercion as a means of influence.⁶⁸ In this sense, the idea of governance is about moving beyond the state that usually uses coercion.⁶⁹ According to Michele Betsill and Harriet Bulkeley, non-state actors share

⁶⁴ Keohane and Nye, *Power and Interdependence*.

⁶⁵ Dries Lesage, Thijs van de Graaf and Kirsten Westphal, *Global Energy Governance in a Multipolar World* (Farnham, Surrey, England: Ashgate, 2010), 4.

⁶⁶ David A. Welch, “What Is ‘Governance,’ Anyway?” *Canadian Foreign Policy Journal* 19, no. 3 (2013): 257, <http://www.tandfonline.com/loi/rcfp20>.

⁶⁷ Margaret P. Karns and Karen A. Mingst, *International Organizations: The Politics and Processes of Global Governance* (Boulder, Colo: Lynne Rienner Publishers, 2010), 150–152.

⁶⁸ Keohane and Nye, *Power and Interdependence*.

⁶⁹ Michele M. Betsill and Harriet Bulkeley, “Cities and the Multilevel Governance of Climate Change” *Global Governance* 12, no. 2 (2006), 44.

responsibility with the state for defining problems and implementing solutions.⁷⁰ The multilevel governance system rejects the top-down approach. If government uses its formal authority backed by an enforcement mechanism, governance actors' activities are "backed by shared goals that may or may not derive from legal and formally prescribed responsibilities."⁷¹

As a process, achieving well-functioning governance may take time and refinement.⁷² The evolving nature of energy governance can clearly be observed along the lines of: "the timescale of technological innovation, the timescale of fossil fuel resource depletion and the timescale of the harmful climate change."⁷³ The transition to a more sustainable and governance regulation-based energy sector is often associated with collective visioning exercises, some collaborative and experimental projects, as well as initiatives promoting networking, innovation in technologies and practices, can apply more traditional policy instruments.⁷⁴

From the actor-centric perspective, governance innovation is about pursuing collective goals in which the state (or government) is not necessarily the only or most important actor.⁷⁵ If for the most part of the twentieth century, the state has been the building block of the international system,⁷⁶ now we quite often observe the retreat of the state.⁷⁷ Global and regional, as well as to certain extent local and national, affairs shifted from a statist toward a polycentric mode of regulation. In this sense, governance implies coordinated actions of more than one

⁷⁰ Betsill and Bulkeley, "Cities and the Multilevel Governance."

⁷¹ James N. Rosenau and Ernst Otto Czempiel, *Governance Without Government: Order and Change in World Politics* (Cambridge [England]: Cambridge University Press, 1992), 4.

⁷² Welch, "What Is 'Governance', Anyway?" 257.

⁷³ William J. Nuttall and Devon L. Manz, "A New Energy Security Paradigm for the Twenty-first Century," *EPRG Working Paper*, 2008, 1-13, doi:10.1016/j.techfore.2008.02.007.

⁷⁴ James Meadowcroft, "What About the Politics? Sustainable Development, Transition Management, and Long Term Energy Transitions," *Policy Sciences* 42 (2009): 335, doi:10.1007/s11077-009-9097-z.

⁷⁵ Betsill and Bulkeley, "Cities and the Multilevel Governance," 11-12.

⁷⁶ Kenneth Waltz, *Theory of International Politics*, Random House (1979).

⁷⁷ Susan Strange, *The Retreat of the State: The Diffusion of Power in the World Economy* (New York: Cambridge University Press, 1996).

authority.⁷⁸ Polycentrism disperses regulation across multiple sub-state, state, supra-state and non-governmental institutions.⁷⁹ Within the governance concept international organizations,⁸⁰ civil society,⁸¹ non-governmental organizations (NGO),⁸² epistemic communities,⁸³ private transnational institutions,⁸⁴ transnational (capitalist) class,⁸⁵ networks⁸⁶ and many other actors are all considered to be the drivers of change.

Actors quite often establish certain institutions to achieve an outcome for which a governance mechanism is designed. These institutions may serve either as an arena/platform for dealing with issues or as an actor if they have motivation and organizational capacity to intervene⁸⁷ and introduce innovations in energy sector development.⁸⁸ At the international level, particularly in the energy sector, such institutions are often formed to improve their position to reduce the risk of suffering competitive disadvantages in the regional and global energy markets.⁸⁹ They also play an important role in coordinating energy policies between energy-producing, consuming, and transit states.⁹⁰ Oraorn Poocharoen and Benjamin K. Sovacool suggest five criteria for the effectiveness of governance mechanisms: “clarity of roles and

⁷⁸ Welch, “What Is ‘Governance’, Anyway?” 256.

⁷⁹ Jan Aart Scholte, *Globalization: A Critical Introduction* (New York: Palgrave Macmillan, 2005), 141.

⁸⁰ Michael N. Barnett and Martha Finnemore, *Rules for the World: International Organizations in Global Politics* (Ithaca: Cornell University Press, 2004).

⁸¹ Richard Price, “Transnational Civil Society and Advocacy in World Politics,” *World Politics* 55, no. 4 (2003), doi:10.1353/wp.2003.0024.

⁸² Alexander Cooley and James Ron, “The NGO Scramble: Organizational Insecurity and the Political Economy of Transnational Action,” *International Security* 27, no. 1 (2002), doi:10.1162/016228802320231217.

⁸³ Peter M. Haas, “Introduction: Epistemic Communities and International Policy Coordination,” *International Organization* 46, no. 1 (1992), doi:10.1017/S0020818300001442.

⁸⁴ Rosenau and Czempiel, *Governance without Government*.

⁸⁵ Strange, *The Retreat of the State*; and Shirin Rai, “Gendering Global Governance,” *International Feminist Journal of Politics* 6, no. 4 (2004), doi:10.1080/1461674042000283345.

⁸⁶ Anne-Marie Slaughter, *A New World Order* (Princeton: Princeton University Press, 2004).

⁸⁷ Laurence L. Delina, “Coherence in Energy Efficiency Governance,” *Energy for Sustainable Development* 16 (2012): 494.

⁸⁸ Ziyi Baron, “Energy Governance Through Innovation Reducing Global Oil Dependency in Transportation Through Innovation,” *Koret-Milken Institute Fellow program*, no. 38 (2010).

⁸⁹ Leonardo Baccini, Veronica Lenzi, and Paul St. Thurner, “Global Energy Governance: Bilateral Trade and the Diffusion of International Organizations,” *LMU Munich* (n.d.).

⁹⁰ Angel Saz and Keegan Pierce, “Towards a Global Governance of Energy,” *ESADEgeo Position Paper* 9, January 2011, 4.

objectives among members; having strong, independent, continual sources of funding; institutional formality (having a permanent secretariat, budget, full time staff, etc.); efficacy, which is the ability to accomplish its mission and goals at the least possible cost; and level of interdependency among members.”⁹¹

Therefore, there are three important pillars upon which governance innovation is based:

- First, diversity and proliferation of governors—international governmental organization,⁹² international non-governmental organizations (INGOs), governments, state agencies, private energy companies, civil society, epistemic communities,⁹³ networks as actors,⁹⁴ etc.;
- Second, cooperation among those actors on different levels of interaction—local/municipal levels,⁹⁵ intergovernmental, or supra-national levels;⁹⁶
- Third, different forms of interaction—formal intergovernmental arrangements,⁹⁷ informal networks,⁹⁸ gatherings of leading economic, political, and cultural leaders.⁹⁹

It is difficult to come up with a single universal formula for ensuring energy sectors’ sustainability through energy governance mechanisms, because there are many ways of making

⁹¹ Ora-orn Poocharoen and Benjamin K. Sovacool, “Exploring the Challenges of Energy and Resources Network Governance,” *Energy Policy* 42 (2012).

⁹² Darren G Hawkins, *Delegation and Agency in International Organizations* (Cambridge, UK: Cambridge University Press, 2006).

⁹³ Haas, “Introduction: Epistemic Communities,” 2.

⁹⁴ Miles Kahler, *Networked Politics: Agency, Power, and Governance* (Ithaca: Cornell University Press, 2009), Chapter I, 2-3

⁹⁵ Charles Elworthy, “The Energy Commons. A Governance Framework for Climate Stability and Energy Security,” July 2011, https://www.academia.edu/834236/The_Energy_Commons_A_Governance_Framework_for_Climate_stability_and_Energy_Security.

⁹⁶ Kal Raustiala and David G. Victor, “The Regime Complex for Plant Genetic Resources,” *International Organization* 58 (Spring 2004): 277–309, doi:10.1017/S0020818304582036; and Sol Picciotto, “Regulatory Networks and Global Governance,” St. G. Hart Legal Workshop, 2006 accessed March 25, 2013 http://eprints.lancs.ac.uk/232/1/Reg_Networks_&_Glob_Gov.pdf

⁹⁷ Kal Raustiala and David G. Victor, “The Regime Complex for Plant Genetic Resources.”

⁹⁸ Slaughter, *A New World Order*.

⁹⁹ Klaus Dingwerth and Philipp Pattberg, “Arenas, Actors and Issues in Global Governance,” (2009) in: Jim Whitman, *Global Governance* (New York: Palgrave Macmillan, 2009), 41-65.

progress in this direction and each depends on the particular characteristics of a country/region.¹⁰⁰ The following chapter presents the analysis of the main characteristics of the Central Asian countries' energy sectors, the level of energy insecurity and energy policy areas that the authorities are currently prioritizing.

Studies of Regional Cooperation in Central Asia

There are a number of studies that approach the issue of regional cooperation in Central Asia from different perspectives. Some of these studies explain why regionalism (or regional cooperation) occurs in one area (for example, the environment or security traditionally conceived) but largely neglected in another (for example, economics). Others explore the impact of domestic politics (e.g., patrimonialism, with a particular focus on rent seeking) on regional cooperative dynamics. Kathleen Collins, for instance, demonstrates a direct relationship between patrimonialism and regionalism in Central Asia. Ruling elites of the Central Asian countries, being primarily concerned about regime survival and personal enrichment, successfully promote cooperation in the security area because this bolsters their rule. At the same time, while paying lip service to economic regionalism, these same elites in practice resist regional economic integration fearing the liberalization would undermine their ability to extract personal benefits.¹⁰¹ While some patrimonial regimes (Kazakhstan, Kyrgyzstan and Tajikistan) proclaim greater openness to regional economic cooperation than others (Turkmenistan and Uzbekistan), Collins argues that economic regionalism has been limited in all Central Asian states.¹⁰² In this regard,

¹⁰⁰ N. Gunningham, "Regulation, Economic, Instrument, and, Sustainable, Energy," *Climate and Environmental Governance Network Working Paper* 12 (2012): 4.

¹⁰¹ Kathleen Collins, "Economic and Security Regionalism among Patrimonial Authoritarian Regimes: The Case of Central Asia," *Europe-Asia Studies* 61, no. 2 (2009): 249–281.

¹⁰² *Ibid.*, 250.

Central Asian state leaders would support any sort of regionalism initiative only as long as it contributed to sustaining their regimes and their ability to extract rents.¹⁰³

Walter Mattli, in *The Logic of Regional Integration*, suggests two primary conditions necessary for regional integration: (a) demand from domestic businesses; and, (b) a willingness of ruling elites to supply it.¹⁰⁴ Like Collins, Erika Weinthal argues that while regional economic integration might yield mutually beneficial trading arrangements in Central Asia, corrupt governments and authoritarian regimes, which mainly rely on external rents, may not have adequate incentive to promote it.¹⁰⁵ Timothy Frye and Edward D. Mansfield demonstrate a clear link between regime type and regional-level trade liberalization by arguing that trade liberalization usually takes place in democratic states.¹⁰⁶ Democratization processes, however, are developing rather slowly in Central Asia. In fact, patrimonialism in Central Asian countries has strengthened in the post-Soviet period. As a result, even powerful external actors now take into account the local rules designed to promote elites' rent-seeking interests.¹⁰⁷ As a result, ruling elites, being concerned about short-term maximization of their personal gains, promote policies (including those that imply a certain level of integration) only if it serves their political and financial interests.¹⁰⁸

Weinthal, in her book on *State Making and Environmental Cooperation: Linking Domestic and International Politics in Central Asia*, attempts to explain why Central Asian

¹⁰³ Erika Weinthal and Pauline Jones Luong, "Prelude to the Resource Curse: Explaining Oil and Gas Development Strategies in the Soviet Successor States and Beyond," *Comparative Political Studies* (34) 4 (2001): 367-399.

¹⁰⁴ Walter Mattli, *The Logic of Regional Integration. Europe and Beyond* (Cambridge: Cambridge University Press, 1999).

¹⁰⁵ Erika Weinthal and Pauline Jones Luong, "Combating the Resource Curse: An Alternative Solution to Managing Mineral Wealth," *Perspectives on Politics* 4, no. 1 (March 2006): 38.

¹⁰⁶ Timothy Frye and Edward D. Mansfield, "Fragmenting Protection: The Political Economy of Trade Policy in the Post-Communist World," *British Journal of Political Science* 33, no. 4 (2003): 635-57.

¹⁰⁷ Alexander Cooley, *Great Games, Local Rules: The New Great Power Contest in Central Asia* (Oxford University Press, 2012).

¹⁰⁸ *Ibid.*, 21.

countries succeeded in developing cooperative dynamics to some extent in the area where it was least expected.¹⁰⁹ She argues that despite the fact that the Central Asian region was prone to conflict in the post-Soviet era, owing to transboundary water disputes and ethnic conflicts, state actors engaged in regional environmental cooperation, which contributed to sustaining stability. Weinthal provides a framework to explain why states would want to establish regional institutions. Weinthal's framework embodies a two-level institution building approach, according to which domestic institutional reforms are linked to the regional cooperation, and provides a role for international organizations, bilateral aid organization, and non-governmental organizations as primary actors promoting regional initiatives.¹¹⁰ These third party actors helped Central Asian states maintain stability in the transformation period and allowed corrupt governments to retain power, but ultimately failed to produce meaningful environmental protection.¹¹¹ In essence, regional state actors engaged in environmental cooperation in an attempt to promote their political interests indirectly. In an environment lacking transparency and accountability, this was not a difficult task to accomplish.¹¹²

One difficulty with this research, however, is that it treats cooperation and non-cooperation as a binary. In reality, Central Asian states do cooperate; they merely cooperate less than they might. Moreover, when they do cooperate, they often do so in ways that do not look like particularly high-quality cooperation from a Western liberal governance perspective. Behind-the-scenes, off the books, or informal trading arrangements are common. And yet these satisfy the core requirement of cooperation, which is to accept a short-term cost in pursuit of

¹⁰⁹ Erika Weinthal, *State Making and Environmental Cooperation: Linking Domestic and International Politics in Central Asia* (Cambridge and London: MIT Press, 2002): 27.

¹¹⁰ Weinthal, *State Making and Environmental Cooperation*, 11.

¹¹¹ *Ibid.*, 9.

¹¹² Theresa Sabonis-Helf, "The Rise of the Post-Soviet Petro-States: Energy Exports and domestic Governance in Turkmenistan and Kazakhstan," in Dan Burghart Theresa and Sabonis-Helf, *In the Tracks of Tamerlane: Central Asia's Path to the 21st Century* (Washington: National Defense University Center for Technology and National Security Policy, 2004): 160.

long-term gain. Such “grey-zone” cooperation can be thought of as taking place on a sliding scale. When we look closely at the Central Asian energy system, we see various shades of grey—which raises the question of whether different forms or levels of cooperation might not be possible that would more closely approximate Pareto-optimality. By examining the detailed interaction of domestic energy markets, the intra-Central Asian energy market, and external energy markets, I argue that the answer is yes. A governance perspective on the problem makes this easier to see than would a simple binary “cooperation problem” approach of the kind most commonly found in the existing literature.

Undoubtedly, rent-seeking elites are often key to the analysis of policy choices in the energy sector. However, the fact that there is an element of rent seeking in all levels of interaction in the energy sector does not imply the absence of other concerns. Put another way, rent-seeking alone does not necessarily explain why governments chose a particular type of interaction over others. While acknowledging the seriousness of the problem of personalistic interests of Central Asian elites, I present a comprehensive analysis of factors affecting decision-making of the Central Asian states.

CHAPTER II. Major Energy Security Concerns and Energy (Security) Policy Priorities of the Central Asian Countries

Central Asian countries' energy sectors were initially designed to operate within a unified energy system managed from Tashkent and controlled by Moscow. After gaining independence, Central Asian leaders reached a common understanding regarding the benefits of sustaining close regional energy cooperation. These same leaders, however, later started pursuing policies that distance countries from each other, leading to the disintegration of the CAES. The breakdown of an interdependent system into separate entities (national energy systems) has, to a different extent, affected the level of energy security in all five countries. In this regard, escalating energy insecurities can only be addressed through increasing intra-Central Asian energy trade and greater regional cooperation.

There are several factors suggesting that studying the energy security problems emerging as a result of CAES ongoing disintegration and exploring the compatibility of the Central Asian states' energy security policies to sustain regional energy cooperation are both timely and important. The World Bank has released the assessment results for the Rogun HPP, according to which 335m high dam is found economically the most efficient with acceptable environmental and social impacts. Tajikistan's desire to build the tallest dam in the world was approved by the World Bank expert panel, yet objection by the Uzbek government may further escalate the conflict over the water-energy balance and negatively impact the level of energy security in Central Asia. Decreasing levels of water in reservoirs due to overuse for electricity production over the last couple of years affects future production volume in upstream Central Asian states, preventing people from simply meeting their basic human needs. With relatively limited oil and gas extraction capacities, Central Asian downstream countries' attempt to increase the volume of

export affects sufficiency of hydrocarbon supplies for domestic and intraregional consumption. Transition from subsidized to market prices while ensuring affordability of energy resources through policy initiatives turned out to be a difficult, but necessary, task. This chapter studies the level of energy insecurity in the region, resource potential that provides some prospects and Central Asian countries' energy security policies affecting regional cooperation. Addressing these and some other energy security problems requires greater regional cooperation promoted by prioritized energy policies. Before closely studying energy security policy priorities of the Central Asian states, the following section defines energy security and security of the CAES.

Defining Energy Security

During the Soviet era, the stability and reliability of energy supply flows in Central Asia were ensured by: first, instructions coming from a single political centre (Moscow); and, second, the resource-sharing mechanism, in which Central Asian upstream countries released water and supplied hydroelectricity in summertime, while downstream neighbours channelled fuel and thermal electricity in winter. After the disintegration of the Soviet Union, Russia inherited the infrastructure that the Central Asian states needed to transport energy out of the region, creating excessive dependence on the Russian pipeline network and energy market. In the 1990s, the Central Asian states continued to barter energy with each other and Russia, in almost the same way as they had in the unified Soviet energy system. However, regional energy exporters' dissatisfaction with the terms of the energy trade dictated by Russia and the willingness of other external customers to invest in the construction of pipeline networks to transport energy while avoiding Russia transformed the relationships among state actors within the CAES. As a result, two interlinked levels of relationships emerged that affect the security of the CAES: first, energy

supply relations within the Central Asian region; and second, energy export/import between Central Asian producers and external customers.

In this particular research work, energy security is defined as a condition states enjoy when they can be confident that they will have adequate and sustainable energy supplies for population and economic needs for the foreseeable future. Adequate energy supplies indicate that states have enough energy resources to meet their needs. Sustainability of energy supplies implies that the present needs are met without compromising energy supplies for future generations. Sustainability of energy can be promoted by increasing the share of RES (hydroelectricity, wind energy, solar energy, etc.) in the overall energy balance and improving energy efficiency by introducing new technologies.

The CAES is a framework/complex system within which various actors interact and affect each other's energy security. Given the above-mentioned definition of energy security, the security of the CAES is the condition in which all Central Asian states enjoy sufficiency and sustainability of energy supplies (for both population and economy needs) simultaneously. The system entails balancing among the energy interests of all. Reaching consensus is difficult, but necessary if the end goal is to make sure that everyone is enjoying energy security.

Table 1: Energy Security Measurement Criteria¹

Energy Security Dimension	Attribute	Interpretation (Preferred)	KAZ	KGZ	TJK	TKM	UZB
Energy supply	(a) Fraction of primary energy as imports	Low	Low	High	High	Low	Low
	(b) Diversification (by fuel type)	High	Low	Low	Low	Low	Low
	(c) Diversification (by source)	High	Med	Low	Low	Low	Med
	(d) Diversification (by transport routes)	High	Med	Low	Low	Low	Med
	(e) Diversification of electricity generation (by fuel type)	High	Low	Low	Low	Low	Med

¹ Vlado Vivoda, "Evaluating Energy Security in the Asia-Pacific Region: A novel Methodological Approach," *Energy Policy*, Vol. 38 (2010), 5261—Energy security criteria were modified to capture main attributes of the Central Asian Energy System. N/M = non-market.

Energy Security Dimension	Attribute	Interpretation (Preferred)	KAZ	KGZ	TJK	TKM	UZB
	(f) Quality of electricity transmission and energy transportation networks	High	Low	Low	Low	Low	Low
	(g) Stocks (i.e. strategic petroleum reserves) as a fraction of imports	High	Med	Low	Low	Low	Low
	(h) Refining/fuel processing capacity as a fraction of primary energy consumption	High	Med	Low	Low	Med	Med
	(i) Reliance on market/non-market mechanisms to secure energy imports or export markets	Market	N/M	N/M	N/M	N/M	N/M
Demand management	(a) Evidence of fossil fuel demand reduction (through conservation/substitution) as a result of policy initiatives	Yes	No	No	No	No	No
	(b) Exposure to demand-side risks:						
	• Demand surges—periods of peak demand in response to extreme conditions	Low	Low	Med	Med	Low	Med
	• Increasing export at the expense of domestic (intra-Central Asian) consumption	No	No	No	Yes	Yes	Yes
Efficiency	(a) Energy efficiency (Gross domestic product (GDP) per unit of energy use (PPP \$ per kg of oil equivalent))	Low	Med	High	High	Low	Med
Economic	(a) Total fuel costs/GDP	Low	Med	High	High	Low	Med
	(b) Fuel imports (% of GDP)	Low	Low	High	High	Low	Low
	(c) Fuel exports (% of GDP)	High	High	Low	Med	High	Med
Environmental	(a) Reliance on fossil fuels as a fraction of primary energy consumption	Low	High	High	Med	High	High
	(b) Carbon Dioxide Emissions	Low	High	Low	Low	High	Med
Human security	(a) Fraction of population with access to basic energy services (i.e. electricity)	High	High	High	High	High	High
Military-Security	(a) Exposure of critical energy infrastructure to energy related military/security risks (i.e. terrorism, conflict over resources, etc.)—conflict may occur over water, but not energy	Low	Low	Low	Low	Low	Low
Domestic socio-cultural-political	(a) Exposure to social or cultural energy-related risks (i.e. NIMBYism, energy sector labor unrest)	Low	High	Low	Low	Low	Low
	(b) Exposure to political energy-related risks:						
	• Strong oil or gas lobby	Low	High	High	High	High	High
	• Disagreements among leaders	Low	Med	Low	High	Low	High
Technological	(a) Diversification for key energy-related industries (i.e. power generation) by technology type	High	Low	Low	Low	Med	Low
International	(a) Commitment to regional and other international cooperation on energy-related issues (i.e. to increased regional energy security cooperation or energy related international agreements)	High	High	Med	Med	High	Low
Policy/governance mechanism (Yes/No)	(a) Existence of energy security strategy	Yes	No	No	No	No	No
	(b) Transparency of energy security policy	High	Med	Med	Low	Low	Low
	(c) Regular policy reviews	Yes	No	No	No	No	No
	(d) Supply issues prioritized in policy	Yes	Yes	Yes	Yes	Yes	Yes

Energy Security Dimension	Attribute	Interpretation (Preferred)	KAZ	KGZ	TJK	TKM	UZB
	(e) Demand management issues prioritized in policy	Yes	No	Yes	Yes	No	Yes
	(f) Efficiency issues prioritized in policy	Yes	Yes	Yes	Yes	No	Yes
	(g) Economic issues prioritized in policy	Yes	Yes	Yes	Yes	No	Yes
	(h) Environmental issues prioritized in policy	Yes	Yes	No	No	No	No
	(i) Human security issues prioritized in policy	Yes	No	Yes	Yes	No	No
	(j) Military/security issues addressed in policy	Yes	No	No	No	No	Yes
	(k) Socio-cultural and political issues prioritized in policy	Yes	Yes	Yes	No	No	No
	(l) Technological issues addressed in policy	Yes	Yes	No	No	Yes	No
	(m) International cooperation issues addressed in policy	Yes	Yes	Yes	Yes	Yes	Yes

The Level of Energy Insecurity in Central Asia

Overall, the Central Asian region does not enjoy energy security. Initially, the energy sectors of the Central Asian countries were designed to operate within a unified energy system. Resource-sharing mechanism was based on rational use of energy, with each state contributing different types of sources (Kyrgyzstan and Tajikistan—hydro power, Kazakhstan—oil and coal, Turkmenistan—gas, and Uzbekistan—oil and gas) to the energy consumption balance of the CAES (Table 2). High dependence on a particular source of energy was not an issue within the CAES, which operated irrespective of political (administrative) and economic borders. Central Asian energy sectors contributed different sources and formed a complete energy system capable of meeting the energy needs of all countries simultaneously (Table 3). The disintegration process of the CAES, however, affected the short- and medium-term availability of gas and thermal electricity to upstream countries and hydroelectricity supplies to downstream states.

Table 2: Production by Source (Balances for 2012 in thousand tonnes of oil equivalent (ktoe) on a net calorific value basis)²

Production	Coal and Peat	Crude oil	Natural gas	Hydro	Biofuels and waste	Total
Kazakhstan	52763	82608	28550	657	59	164638
Kyrgyzstan	422	79	24	1219	4	1749
Tajikistan	180	30	9	1453	0	1672
Turkmenistan	0	11805	56223	0	0	68028
Uzbekistan	1354	3338	51088	964	4	56748

Table 3: Diversification of Electricity and Heat Generation (by Fuel Type) for 2012³

	Kazakhstan		Kyrgyzstan		Tajikistan		Turkmenistan		Uzbekistan	
Production from	Electricity: GWh	Heat: Terajoule (TJ)	GWh	TJ	GWh	TJ	GWh	TJ	GWh	TJ
Coal	69421	413425	728	11484	0	0	0	0	2145	4767
Oil	735	4656	180	0	0	0	0	0	383	851
Gas	13411	0	81	2050	74	405	17750	8567	38762	95257
Biofuels	0	0	0	0	0	0	0	0	0	0
Waste	0	0	0	0	0	0	0	0	0	0
Nuclear	0	0	0	0	0	0	0	0	0	0
Hydro	7637	0	14179	0	16900	0	0	0	11210	0
Geothermal	0	0	0	0	0	0	0	0	0	0
Solar PV	0	0	0	0	0	0	0	0	0	0
Solar thermal	0	0	0	0	0	0	0	0	0	0
Wind	3	0	0	0	0	0	0	0	0	0
Tide	0	0	0	0	0	0	0	0	0	0
Other sources	0	0	0	0	0	0	0	0	0	0
Total production	91207	418081	15168	13534	16974	405	17750	8567	52500	100875

² International Energy Agency, *Statistics: Balances for 2012 in Thousand Tons of Oil Equivalent (ktoe) on a Net Calorific Value Basis* (Paris: International Energy Agency, n.d), accessed January 15, 2015, <http://www.iea.org/statistics/statisticssearch/report/?country=KAZAKHstAN&product=balances&year=2012>.

³ International Energy Agency, *Electricity and Heat for 2012* (Paris: International Energy Agency, n.d), accessed January 15, 2015, <http://www.iea.org/statistics/statisticssearch/report/?year=2012&country=KAZAKHstAN&product=ElectricityandHeat>.

The landlocked geographical status of the region limits state actors' ability to diversify their export/import dependence. The interdependence that the CAES entails put regional importers in a position where they are vulnerable to frequent energy supply disruptions caused by the process of the disintegration of the system.

Central Asian energy sectors are highly energy intensive. Fossil fuel-based regional energy sectors are environmentally damaging (Table 4). So far, no policy initiative has succeeded in reducing fossil fuel demand in Central Asian countries. Only Tajikistan and Kyrgyzstan have, to some extent, decreased fossil fuel consumption for the last several years. However, it was not the result of an effective policy initiative, but rather fossil fuel supply cuts from neighbouring states, which caused severe energy shortages in these countries (Table 5).

Table 4: Carbon Dioxide Emissions

	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
Total Carbon Dioxide Emissions from the Consumption of Energy (Million Tonnes) for 2012 ⁴	224.220	9.278	2.973	64.979	123.170
CO ₂ Emissions (tonnes of carbon dioxide per person), 2011 ⁵	12	1.6	0.4	11	4.2

Table 5: Reliance on Fossil Fuel as a Fraction of Primary Energy Consumption, 2011⁶

	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
Percent	98.9	68.4	42.9	n/a	98.2

⁴ US Energy Information Administration (EIA), *Statistics: Total Carbon Dioxide Emissions from the Consumption of Energy (Million Metric Tons)*, (Washington, DC: US EIA, n.d), accessed January 10, 2015, <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=90&pid=44&aid=8&cid=KZ,KG,TK,TX,UZ,&syid=2012&eyid=2012&unit=MMTCD>.

⁵ US EIA, *Statistics: Per Capita Carbon Dioxide Emissions from the Consumption of Energy (Metric Tons of Carbon Dioxide per Person)* (Washington, DC: US EIA, n.d), accessed January 4, 2015, <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=90&pid=45&aid=8&cid=KZ,KG,TK,TX,UZ,&syid=2007&eyid=2011&unit=MMTCD>.

⁶ World Bank, *Fossil Fuel Energy Consumption (% of Total)* (Washington, DC: World Bank, n.d), The World Bank Data, accessed January 15, 2015, <http://data.worldbank.org/indicator/EG.USE.COMM.FO.ZS/countries>.

The energy sectors of Central Asian countries are also highly subsidized (Table 6 and 7). Subsidizing keeps prices for energy low enough to make it affordable to the population and industries (Table 8). Low energy prices and a long legacy of the Soviet period (during which saving energy was not a priority), however, turned out to be discouraging factors for using energy efficiently. Moreover, outdated energy production facilities (Table 9) and lack of investment in maintaining energy infrastructure cause considerable energy losses (Table 10) and negatively impact the availability of energy resources in Central Asia.

Table 6: Fossil Fuel Consumption Subsidy Rates as a Proportion of the Full Cost of Supply, 2013⁷

	Kazakhstan	Turkmenistan	Uzbekistan
Average subsidization rate (%)	32.8%	65.7%	58.7%
Subsidy (US\$/person)	358.6	1593.4	406.1
Total subsidy as share of GDP	2.8%	20.6%	21.7

Table 7: Fuel Subsidy (US\$ billion, real 2013)

	Kazakhstan			Turkmenistan			Uzbekistan		
Fuel	2011	2012	2013	2011	2012	2013	2011	2012	2013
Oil	2.5	1.7	2.1	3.6	3.8	3.8	0.6	0.7	0.6
Gas	0.9	0.8	0.8	4.3	4.4	4.2	9.1	9.8	9.7
Coal	3.2	2.8	2.4	0	0	0	0	0	0
Electricity	2.5	2.4	0.7	0.3	0.3	0.3	2.7	2.4	1.9

Table 8: Pump Price for gasoline (US\$ per L)⁸

	2004	2006	2008	2010	2012
Kazakhstan	0.52	0.70	0.83	0.71	1.01
Kyrgyzstan	0.48	0.64	0.80	0.85	0.89
Tajikistan	0.67	0.80	1.03	1.02	1.45
Turkmenistan	0.02	0.02	0.22	0.22	0.22
Uzbekistan	0.35	0.85	1.35	0.92	1.02

⁷ International Energy Agency, *Fossil Fuel Consumption Subsidy Rates as a Proportion of the Full Cost of Supply, 2013* (Paris: International Energy Agency, n.d), accessed June 15, 2015, <http://www.iea.org/subsidy/index.html>.

⁸ World Bank Group, *Pump Price for Gasoline (US\$ Per Liter)* (Washington, DC: World Bank, n.d), accessed January 15, 2015, <http://data.worldbank.org/indicator/EP.PMP.SGAS.CD?display=default>.

Table 9: Age of Installed Generation Assets⁹

	Up to 10 years	11 to 20 years	21 to 30 years	Over 30 years
Kazakhstan	11%	11%	33%	44%
Kyrgyzstan	4%	9%	23%	64%
Tajikistan	14%	0%	12%	74%
Uzbekistan	7%	5%	13%	75%

Table 10: Electricity Transmission and Distribution Losses (Percent of Output)¹⁰

	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
2011	7.4	21.8	16.7	12.7	8.8

Exchange of energy resources ensured the stability and reliability of energy supplies within the CAES. While Central Asian countries' desire to establish and strengthen their national energy systems is understandable, it requires a gradual transition from current interdependence into independently operated and self-sufficient energy systems. In other words, the pace of decreasing intraregional energy trade should be symmetrical to increasing energy production and extending energy supply networks in each country. Central Asian countries' energy policies, however, prioritize establishing independent energy systems, while underestimating the importance of intraregional energy trade to ensure energy security along the above-mentioned transition.

While none of the Central Asian states has adopted a document clearly determining energy policy priority areas or energy security strategies, based on the analysis of various official documents, state programs, governmental information agencies as well as interviews with experts and state officials, I have highlighted areas of the energy sector development that are currently being prioritized in Central Asian countries' energy policies. The following sections of

⁹ Asian Development Bank, Technical Assistance Consultant, *Central Asia Regional Economic Cooperation: Power Sector Regional Master Plan* (Metro Manila: Asian Development Bank, Report no. 43549, 2012), accessed January 15, 2015, <http://adb.org/sites/default/files/projdocs/2010/43549-01-reg-tar.pdf>.

¹⁰ World Bank Group, *Electric Power Transmission and Distribution Losses (Percent of Output)* (Washington, DC: World Bank, n.d), accessed May 10, 2014, http://data.worldbank.org/indicator/EG.ELC.LOSS.ZS?order=wbapi_data_value_2011+wbapi_data_value+wbapi_data_value-last&sort=asc.

the dissertation point out the major flaws of these policies and highlight their limited contribution to improving the level of energy security in the region.

Energy Policy Priorities of the Central Asian States

The current energy policies of the Central Asian countries prioritize establishing and strengthening national energy systems by increasing energy production capacity as well as building countrywide energy transportation networks. Government officials also claim to be interested in attracting investment to improve energy efficiency and develop RES. The chapter emphasizes that the development of energy sectors in these directions can improve the level of energy security only in combination with restoring intra-Central Asian energy trade, which may take the form of both long-term formal trading arrangements or swap, barter, and other exchange type mechanisms. But the analysis of competing energy policies of the Central Asian states shows that intraregional energy trade is currently not prioritized. Lack of intra-Central Asian energy trade may not be very surprising given what we know about the lack of regional cooperation in general. It is, nonetheless, important to analyze measures prioritized by the Central Asian governments to improve the level of energy security in their respective countries and the practical affect these measures can possibly have, because such analysis is helpful to understand irrationality behind establishing independent energy systems.

Kazakhstan's Energy Sector

Kazakhstan is a major electricity producer and a consumer in Central Asia. Its peak annual consumption amounted to 104.7 billion kWh in 1990. Even though annual electricity consumption decreased to 50.7 billion kWh per year in 1999, the consumption rate had been

increasing for around 5 percent throughout the 2000s.¹¹ Due to its vast territory and lack of countrywide electric power transmission infrastructure, Kazakhstan has been securing adequate electricity supply through cooperation with neighbouring countries.

Kazakhstan's electric power grids operate in parallel with both Russian and the unified Central Asian electric power systems. It is divided into three zones: northern zone (Akmola, Aktube, Kostanay, Pavlodar, North-Kazakhstan, East-Kazakhstan, Karaganda); southern zone (Almaty, Zhambyl, Kyzylorda, south-Kazakhstan); and western zone (Atyrau, Mangystau, and West-Kazakhstan regions). The southern zone is connected to the electric power grids of Uzbekistan and Kyrgyzstan. Northern regions are supplied with electricity from cheap Ekibastus coal-fired thermal power plants (TPP). While the northern zone produces 72.7 percent of the total electricity in the country, despite significant production capacity there is also growing demand for it. The northern zone operates in parallel with Russian electric power grids connected via 220–500–1050 kV transmission lines. It is also expected that 500 kV transmission line, with the capacity of 1000 MW, will move electricity from coal-rich Ekibastuz to China.¹² The north–south 500 kV transmission line was built in 1998 to cover the peak electricity needs of the southern regions of Kazakhstan and to secure itself from unilateral supply cuts from the electric power grids of Uzbekistan.¹³

During the years of independence, more than 208 hydrocarbon fields, out of which half account for oil, one-third for oil and gas, and the remaining for gas and gas condensate, were discovered in Kazakhstan.¹⁴ The country is a major oil producer in the region. Even without the

¹¹ Ministry of Oil and Gas of the Republic of Kazakhstan, *Neftyanaya Promishlennost (Oil Industry)* (Astana: Mgm.gov.kz, n.d), accessed March 10, 2014, <http://mgm.gov.kz/news/42>.

¹² Adilet legal portal, *O Programme Razvitiya Elektroenergetiki do 2030 Goda (On the Program on Electric Power Development Until 2030)* (Adilet.zan.kz, 2010), accessed March 1, 2014, http://adilet.zan.kz/rus/docs/P990000384_.

¹³ Adilet legal portal, “On the Program on Electric Power Development until 2030.”

¹⁴ Ministry of Environmental Protection of the Republic of Kazakhstan, “Sostavlenie Ekologo-Energeticheskix Reytingov Predpriyatiy Kazaxstana na 2013 (Calculating Ecological and Energy Ratings of Enterprises in

3.2 million tonnes of oil that was supposed to be added from exploiting the giant Kashagan field, Kazakhstan produced 81.8 million tonnes in 2013.¹⁵ Seventy-three percent of Kazakhstan's hydrocarbon resources is concentrated in the Atyrau district, with 4 percent in Aktyubinsk, 9 percent in the west of Kazakhstan and 12 percent in Mangistau. Overall, 96 percent of oil resources in the country fall to the western region.¹⁶ The government is planning to increase the volume of oil condensate production from 81.8 million tonnes up to 112 million tonnes by 2030.¹⁷ In achieving this goal, the role of international energy companies cannot be underestimated, since Kazakhstan controls only one-fifth of the overall oil and gas condensate extraction in the country.¹⁸

Kazakhstan for 2013),” (Astana: Report no. 07-1-223, n.d), 5,
<http://energo.gov.kz/uploads/files/2015/03/%D0%9E%D1%82%D1%87%D0%B5%D1%82%20%D0%B7%D0%B0%D0%BA%D0%BB%D1%8E%D1%87%D0%B8%D1%82%D0%B5%D0%BB%D1%8C%D0%BD%D1%8B%D0%B9%20%D1%80%D0%B5%D0%B9%D1%82%D0%B8%D0%BD%D0%B3%D0%B8.PDF>.

¹⁵ Ministry of Environmental Protection of the Republic of Kazakhstan, “Calculating Ecological and Energy Ratings of Enterprises in Kazakhstan for 2013.”

¹⁶ Rinat Kulmagambetov, “Energiya Kaspiyskogo Shelfa (Energy of the Caspian Shelf),” *Kazenergy*, June 28, 2013, accessed December 1, 2014, <http://kazenergy.com/en/component/content/article/47-2011-04-18-15-36-46/9844-2013-06-28-04-52-45.html>.

¹⁷ U. Karabalin, “Voloviy Obyom Dobichi Neftekondensata k 2030 Godu Sostavit Poryadka 112 mln. Ton v God” (Gross Production of the Oil Condensate Will Reach 112 mln. tonnes by 2030), (Government of the Republic of Kazakhstan, 2014), accessed October 5, 2014, <http://www.government.kz/index.php/ru/novosti/16672-valovyy-ob-em-dobychi-neftekondensata-k-2030-godu-sostavit-poryadka-112-mln-tonn-v-god-u-karabalin.html>.

¹⁸ Nurlan Zhumagulov, “Fakti i Cifri Neftegazovoy Otrasi Kazaxstana za 2013 God (Facts and Figures of Kazakhstan's Oil and Gas Industry for 2013),” *YourVision*, 2014, accessed October 1, 2014, http://yvision.kz/post/405781#comment2555459?utm_source=last_comments&utm_medium=main&utm_campaign=last_comments.

Table 11: Oil Sector Development, 2013¹⁹

Production companies	Shareholders	Volume (tonne)	Share (%)
Tengizchevroil	Exxon Mobil, KMG, Lukoil	27,105,645	33.1
Karachaganak Petroleum Operating	ENI, BG, KMG, Lukoil	11,657,730	14.3
Mangistaumunaigas	KMG and CNPC	6,076,840	7.4
CNPC–Aktobemunaigas	CNPC	5,863,048	7.2
Uzenmunaigas	KMG	5,207,653	6.4
Kazgermuani	KMG, PetroChina	3,107,002	3.8
Embamunaigas	KMG	2,840,900	3.5
Petro Kazakhstan Kumkol Resources	KMG, PetroChina	2,407,720	2.9
Karajambasmunai	KMG, CITIC	2,051,678	2.5
Buzachi Operating Ltd	CNPC, Lukoil	1,990,762	2.4
Turgai Petroleum	KMG, PetroChina, Lukoil	1,655,391	2.0
Kazakhoil Aktobe	KMG and Lukoil	1,150,449	1.4
Karadukmunai	Lukoil, India	959,472	1.2
Zhaikmunai	Europe	870,547	1.1
KuatAmlonmunai	China	812,948	1.0
Sauts–Oil	Shymkent	810,022	1.0
Kaspiy neft	Ordabasy corporation	705,298	0.9
Kolzhan		673,898	0.8
Maten Petroleum	Private businessmen	547,032	0.7
Alties Petroleum Int.	Great Britain	413,782	0.5
Others		4,881,485	6.0
Total		81,789,302	100

Kazakhstan also possesses significant gas reserves in the amount of around 1.5²⁰ and 1.9²¹ trillion m³ according to different sources. It produced 42.3 billion m³ of gas in 2013, out of which 22.8 billion m³ was market gas, which is supplied for domestic consumption and exported to external markets. The other half of the gas produced in Kazakhstan is pumped back into oil wells to enhance oil production. Karachaganak deposit is the largest contributor (8.5–9 billion m³ per year) to the gas production in Kazakhstan. Over 90 percent of gas produced in Karachaganak, however, is delivered to Orenburg gas processing plant in Russia, more than half

¹⁹ Zhumagulov, “Facts and Figures of Kazakhstan’s Oil and Gas Industry for 2013.”

²⁰ British Petroleum Company, *BP Statistical Review of World Energy June 2015* (London: British Petroleum Co., 2015), accessed June 25, 2015, <http://www.bp.com/content/dam/bp/pdf/Energy-economics/statistical-review-2015/bp-statistical-review-of-world-energy-2015-full-report.pdf>.

²¹ Eni, *World Oil and Gas Review for 2014* (Rome: Eni spa), September 2014, <https://www.eni.com/world-oil-gas-review-2014/sfogliabile/O-G-2014.pdf>.

of which is returned back to Kazakhstani customers and the rest remains in Russia.²² Kazakhstan consumes only half of the market gas it produces (10.9 billion m³ in 2013); it exports the other half due to lack of countrywide gas pipeline infrastructure and imports the same amount from neighbouring countries. According to the agreement on swap deliveries of gas between Gazprom, Uzbekneftgaz, and KazMunaiGaz on December 27, 2006, gas import is swapped in accordance with the export of the Karachaganak gas field in equal price and equal volume. Kazakhstan exported 8.6 billion m³ of gas and transited 99.146 billion m³ through its territory in 2013. It also has the capacity to store around 1 billion m³ in its underground reserves.²³ Twenty-seven percent of gas and condensate resources fall to Atyrau district, 8 percent to Aktyubinsk, 50 percent to the west of Kazakhstan, and 10 percent to Mangistau.²⁴ The following are the major gas producing companies in Kazakhstan.

Table 12: Gas Sector Development, 2013²⁵

Gas Production Companies	Volume (thousand cubic meters)	Share (%)
Karachaganak Petroleum Operating	17,530,694	41.4
Tengizchevroil	14,550,857	34.4
CNPC–Aktobemunaigas	3,479,040	8.2
Zhaikmunai	1,462,701	3.5
Kazakhoil Aktobe	565,474	1.3
Mangistaumunaigas	524,834	1.2
Kazgermunai	519,588	1.2
Petro Kazakhstan Kumkoi Resources	417,508	1.0
Kazmunaigas	405,426	1.0
KazGPZ	392,005	0.9
Others	2,446,618	5.8
Total	42,294,745	100

²² Simon Pirani, “Central Asian and Caspian Gas Production and the Constraints on Export,” *Oxford Institute for Energy Studies* (2012): 45, http://www.oxfordenergy.org/wpcms/wp-content/uploads/2012/12/NG_69.pdf.

²³ Government of the Republic of Kazakhstan, *Koncepciya Razvitiya Gazovogo Sektora Respubliki Kazaxstan do 2030 Goda (Gas Sector Development Concept of the Republic of Kazakhstan until the Period of 2030)*, Online.zakon.kz, December 5, 2014, http://online.zakon.kz/Document/?doc_id=31641775.

²⁴ Kulpash Konirova, “Kaspiy Stanet Odnim iz Klyuchevix Regionov Mirovogo Neftyanogo Rinka (Caspian Region Will Turn into Key World Oil and Gas Market),” *Kazenergy* 4, no. 59 (2013), accessed February 5, 2014, <http://kazenergy.com/en/4-59-2013/11549-2013-10-30-08-47-58.html>.

²⁵ Zhumagulov, “Facts and Figures of Kazakhstan’s Oil and Gas Industry for 2013.”

Despite having huge renewable energy potential, the amount of RES in the overall energy consumption balance being less than 1 percent remains highly underdeveloped. Kazakhstan has declared its plans to invest 2 percent of the GDP in “green modernization” and development of renewable sources.²⁶ For instance, the wind potential of the mountain pass to China, the Jungar Gates, can potentially provide around 1.3 trillion kWh annually.²⁷ Unfortunately, little progress has been achieved so far.

Kazakhstan: Multi-vector/Diversification Oriented Energy Policy

Kazakhstan’s current energy policy is primarily concerned with securing demand for its energy and earning revenues to fill the budget from moving energy out to external markets. Unstable energy supplies within the CAES over the last several years, however, forced Kazakhstan to strengthen its independent and self-sustaining energy system. In a number of energy sector development programs, the government of Kazakhstan seems to have been focusing on establishing countrywide energy infrastructure as well as the development of RES and increasing energy production and transportation efficiency. But the current energy policy does not prioritize intra-Central Asian energy cooperation. Even though Kazakhstan’s energy policy does not prioritize intra-Central Asian cooperation, the country remains connected to the region due to its partial dependence on Uzbek resources, and the fact that it is a major transit country for Turkmen and Uzbek gas, as well as an important supplier of energy to Kyrgyzstan.

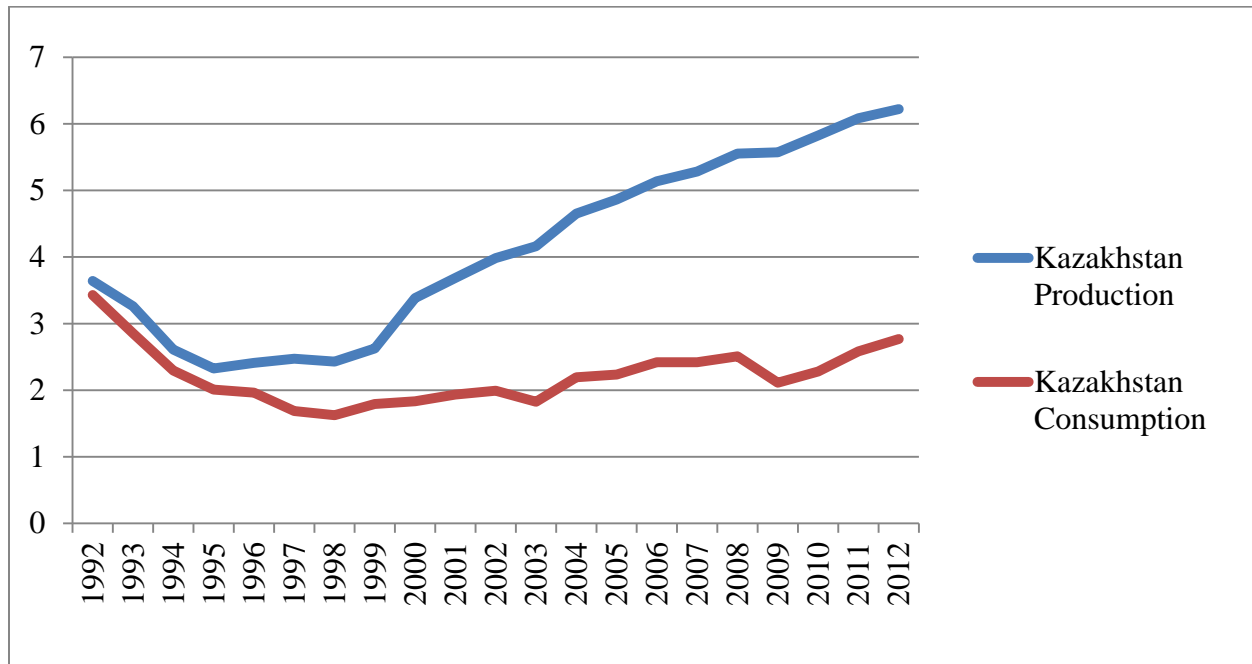
²⁶ Ministry of Environmental Protection of the Republic of Kazakhstan, “Calculating Ecological and Energy Ratings of Enterprises in Kazakhstan for 2013.”

²⁷ “Sound Logic Behind Renewable Expansion” *Invest in Kazakhstan 2013*, 82, accessed June 1, 2015, http://kazakhstan.newsdeskmedia.com/Images/Upload/invest_in_kazakhstan/PDFs/Investment-Opportunities-Power-Energy.pdf.

Addressing Energy Demand Insecurity

Newly explored significant coal, oil, and gas reserves in combination with increasing foreign investments in Kazakhstan's energy sector ensured rapid energy production growth in the country.

Figure 1: Primary Energy Production and Consumption (quadrillion BTU) of Kazakhstan, 1992–2012²⁸

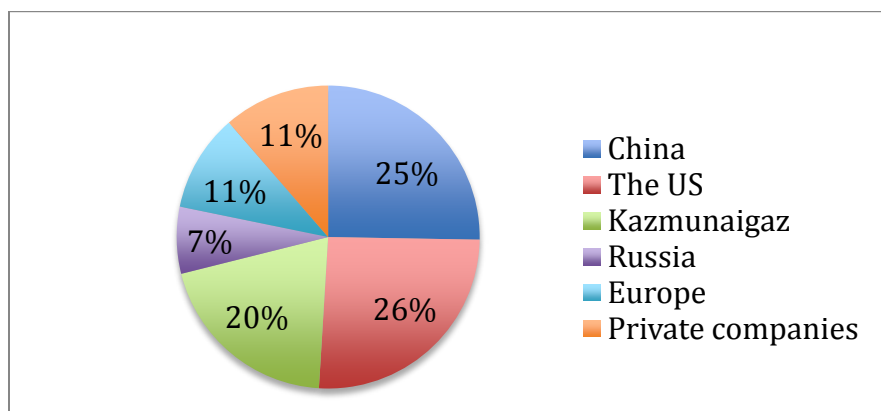


In the early 1990s, to boost its economic growth by developing its oil and gas potential, Kazakhstan opened up its market for international energy companies. Winners of the race for Kazakhstani resources were companies such as ChevronTexaco, ExxonMobil, Agip/Eni, Royal Dutch Shell, British Group, TotalFinaElf, and Impex. Canadian, Middle Eastern, and Russian energy companies followed them. Chinese and Indian extractive and financial corporations started playing a more active role in the mid-2000s.

²⁸ US EIA, *International Energy Statistics: Kazakhstan* (Washington, DC: US EIA, n.d), accessed January 3, 2015, <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=44&pid=44&aid=2&cid=KZ,&syid=1992&eyid=2012&unit=QBTU>.

However, Kazakhstan does not enjoy full control over both extraction of its resources and transportation of energy to external markets. The fact that the national energy company owns only one-fifth of energy resource extraction (see Figure 2) and that the oil supply routes to its major European customers (Europe imports 75 percent of Kazakh oil)²⁹ pass through Russia alone raise serious concerns among the general population and the government. Perceiving the product-sharing agreements (PSAs) signed with international oil giants in the early 1990s as unfair, Kazakh authorities have attempted to regain control over the country's natural resources by reversing those agreements and diversify their energy export route dependence.³⁰

Figure 2: Oil and Gas Condensate Extraction (2012)³¹



Increasing oil and gas production capacity over the last decade turned Kazakhstan into a major exporter of these resources in the region. Kazakhstan exported 72,077 million tonnes of oil and gas condensate through the Atyrau–Samara pipeline (15,375 million tonnes), Caspian Pipeline Consortium (28,712 million tonnes), Atasu–Alashankou pipeline (11,828 million tonnes), Aktau sea port (6,269 million tonnes), and by railroad (9,034 million tonnes).³² The largest volume of oil export is to the European market. However, there is no oil transport

²⁹ Zhumagulov, “Facts and Figures of Kazakhstan’s Oil and Gas Industry for 2013.”

³⁰ Ariel Cohen, *Kazakhstan: The Road to Independence: Energy Policy and the Birth of a Nation* (Uppsala: Silk Road Studies Program, Institute for Security and Development Policy [distributor], 2008), 119.

³¹ Zhumagulov, “Facts and Figures of Kazakhstan’s Oil and Gas Industry for 2013.”

³² Ministry of Oil and Gas of the Republic of Kazakhstan, “Oil Industry.”

infrastructure directly connecting Kazakhstan with Europe. The pipelines pass through and are controlled by Russia, making Kazakhstan vulnerable to export demand insecurity (threat of the unilateral import disruption by a single country that may significantly affect producing state).

Table 13: Oil Export Structure, 2013³³

Destination	Volume (tonnes)	Share (%)	Price US\$ for 1 tonne
Italy	18,183,502	27	820
China	11,167,961	16	778
Netherlands	9,100,386	13	825
France	5,943,611	9	843
Austria	4,700,374	7	760
Switzerland	3,988,283	6	786
Romania	2,823,244	4	782
Canada	2,763,105	4	877
Spain	2,175,411	3	806
Turkey	1,353,165	2	835
Portugal	1,137,807	2	820
Israel	957,561	1	834
Greece	790,940	1	842
Great Britain	676,591	1	811
Croatia	422,003	1	830
Other countries	1,910,605	3	
Total	68,094,551	100	811

The behaviour of Kazakhstan reflects governments' dissatisfaction with previous PSAs, which were signed during difficult times for the economy in the 1990s when oil prices were low and foreign companies had the advantage. At that time, the Kazakh government was ready to sacrifice the right to fully control its natural resources for potential economic gains.³⁴ Simple dissatisfaction turned, over time, to governments' policies to change the terms of contracts. Kazakhstan's parliament, for instance, adopted new laws in 2007 that allow the Kazakh government to break natural resource contracts and force negotiations.³⁵ Kazakhstan used

³³ Zhumagulov, "Facts and Figures of Kazakhstan's Oil and Gas Industry for 2013."

³⁴ Bela Rashidova, Head of Economic Studies Department, at Kazakhstan Institute for Strategic Studies under the President of the Republic of Kazakhstan, Personal Interview, Almaty, Kazakhstan, August 8, 2013.

³⁵ Jean A. Garrison and Ahad Abdurahmonov, "Explaining the Central Asian Energy Game: Complex Interdependence and How Small states Influence their Big Neighbors," *Asian Perspective* 35 (2011): 394.

environmental claims to renegotiate existing contracts with a number of major oil companies in 2003. In 2007, disputes over environmental issues helped Kazakhstan to change the framework of Eni's operation of the Kashagan field.³⁶ In addition, "some analysts believe that Kazakhstan leaders are using China to increase its leverage in negotiations with Russia."³⁷

Cooperation with leading energy companies and increasing energy export capacity to Europe, Russia, and China constitute the core of Kazakhstan's foreign energy policy. However, energy cooperation with Central Asian countries, which was once critical for stable and reliable supplies of energy, is not a priority anymore. Kazakhstan's dependence on neighbouring Uzbekistan and, to a limited extent, Kyrgyzstan is expected to decrease in the future.

In the long term, Kazakhstan claims that it aims to diversify energy sources; the country's short-term goal is to diversify its energy export routes. This lines up with the Multi-vector Foreign Policy adopted by the government. However, moving energy resources out does not directly contribute to the energy security of the country. As a landlocked country, Kazakhstan, like other regional exporters, has very limited access to global energy markets and is already directly connected to two major customers—Russia and China. But the exchange of energy resources with neighbouring Uzbekistan and Kyrgyzstan, at least in the short-term perspective, does contribute to the country's energy security. Kazakhstan consumes only half of its overall gas production and exports the other half because it lacks extensive internal gas supply networks to transport energy from resource-rich regions to distant population centres. However, the lack of extended gas and electricity supply networks does not dramatically impact the overall gas consumption in Kazakhstan because gas shortages are compensated by natural gas swap deals. Kazakhstan supplies 4.5 billion m³ per year to Russia in the north-west, while it imports

³⁶ Brenda Shaffer, *Energy Politics* (Philadelphia: University of Pennsylvania Press, 2009), 32.

³⁷ Mehmet Ogutcu and Ma Xin, "Geopolitics of Energy: China and the Central Asia," *Insight Turkey* 9, no. 4 (n.d.): 54, http://files.setav.org/uploads/Pdf/ogutcu_ma.pdf.

approximately 3.5 billion m³ per year from Uzbekistan in the south and 1 billion m³ per year in the north.³⁸ When Kazakhstan completes the process of establishing its independent energy system, it is broader economic and political interests and not energy security that will drive the country's engagement into regional energy dialogues. In any case, the fact that Kazakhstan can still benefit from exchanging energy resources with Kyrgyzstan (potentially Tajikistan) and Uzbekistan and its important energy transit status will keep it connected to the neighbouring Central Asian states.

Table 14: Kazakhstan—Major Energy Export Items (US\$ Million and as Percentage of Total Exports)³⁹

	Crude oil and gas condensate		Natural gas	
	US\$ million	%	US\$ million	%
1995	7,931	48.9	20	0.4
2000	4,502	51.1	38	0.4
2005	17,395	38.5	410	1.5
2008	41,303	58.0	976	1.4
2009	26,207	60.7	1,389	3.2
2010	36,950	61.3	746	1.2
2011	55,128	62.4	2,236	2.5

Rich in fossil fuel deposits, Kazakhstan succeeded in attracting foreign investment in developing its energy potential. Increasing energy production ensured stable and reliable supplies of energy to meet its domestic, as well as external, needs. Along with developing oil, gas, and coal sectors, the Kazakh government has recently started to claim that it prioritizes sustainability of energy supplies through the development of RES and increasing energy efficiency. As part of the CAES, Kazakhstan has sometimes suffered from disputes over payment, unauthorized

³⁸ Naubet Bisenov, "Neighbourly Negotiations," *Energy Global*, 2013, accessed June 15, 2014, www.energyglobal.com/news/pipelines/articles/Neighbourly_negotiations_an_analysis_of_central_asian_energy_pipelines.aspx.

³⁹ Central Asia Data Gathering and Analysis Team, "Trade Policies and Major Export Items in Central Asia," *Central Asia Regional Data Review*, OSCE Academy and NUPI 8 (2013): 8, <http://www.osce-academy.net/upload/GADGAT/CADGAT8.pdf>.

withdrawal of energy and supply disruptions from neighbouring countries. To reduce its dependence on Uzbekistan and Kyrgyzstan in supplying its southern regions, the Kazakh government has been promoting energy projects to strengthen the national energy system.

Securing Energy Supplies to Southern Kazakhstan

Kazakhstan has considerable energy production capacity, but still lacks the energy transport infrastructure to move resources throughout the country. Within the CAES, southern regions have been relying on energy supplies from neighbouring Uzbekistan and Kyrgyzstan. To secure itself from unilateral energy supply cuts from these countries, Kazakhstan has decided to strengthen countrywide electric power grids (north–south).⁴⁰ While it is disagreements over payment and cut-off of supplies from Uzbekistan that mostly affect energy cooperation, in the case of Kyrgyzstan, it is the Kyrgyz government’s technical incapability to fully manage its electric power system that caused the electricity supply cuts.

The northern electric power plants produce more electricity than northern territories consume. A transmission line connecting the north and south, which was put in place in 1998, ensured the country’s ability to meet peak electricity demand due to extreme weather conditions or sudden supply cuts within the Central Asian (Electric) Power System (CAPS).⁴¹ The security of electricity supplies to southern regions requires complex measures be taken. Electric power transmission lines, connecting Southern Kazakhstan with Uzbekistan and Kyrgyzstan within the CAPS, are capable of transporting up to 8–9 billion kWh annually in both directions. The Zhambyl power plant, which can add 5–7 billion kWh per year, will not only supply domestic electricity market but also export electricity to its southern neighbours. According to the

⁴⁰ Dinara Nurusheva, Vice-President Kazakhstan Center for Humanitarian and Political Trends, Personal interview, Almaty, Kazakhstan, April 20, 2014.

⁴¹ Adilet legal portal, “On the Program on Electric Power Development until 2030.”

estimated figures of the (former) Ministry of Industry and New Technologies of Kazakhstan, the volume of electricity consumption will increase up to 170 billion kWh annually by 2030.⁴² To meet the growing electricity demand of the south, Moynak HPP—with a capacity of 300 MW—was connected to electric power transmission lines and 2x660 MW Balkhash TPPs are expected to start supplying electricity in 2017.⁴³ Sixty percent of hydro-power potential is concentrated in the mountainous south-eastern region, which has the capacity to produce 8 billion kWh annually that can contribute to the sustainability of Kazakhstan’s electric power sector.⁴⁴ Until all these projects are implemented, intra-Central Asian electricity trade is the most secure way to ensure a sufficient amount of electricity supplies to the southern regions of the country.

Kazakhstan consumes only half of its produced gas and exports the other half, because it lacks extensive internal gas supply networks to transport it within the country. Gas shortages in some areas are compensated by swap deals with Russia and Uzbekistan. Frequent unilateral gas supply disruptions and disputes over the price with Uzbekistan, however, forced Kazakhstan to look for alternatives to reduce its dependence. The most optimal alternative was to build a pipeline connecting the gas-producing regions of Western Kazakhstan and Kyzylorda with the major gas-consuming regions Shymkent and Almaty. The Beineu–Bozoy–Shymkent pipeline is designed to provide such connections. The government believes that once implemented, this project is expected to ensure full gasification of 13 regions out of 16 by 2030 and increase the

⁴² Adilet legal portal, “On the Program on Electric Power Development until 2030.”

⁴³ Commonwealth of Independent States, *O Razvitii Sotrudnichestva Gosudarstv–Uchastnikov SNG v Sfere Elektroenergetiki. Problemi i Perspektivi* (On the Development of Cooperation of CIS Member States in the Field of Energy. Problems and Perspectives), (CIS Internet Portal, 2013), accessed May 20, 2014, <http://www.e-cis.info/page.php?id=23654>.

⁴⁴ Ministry of Industry and New Technologies of the Republic of Kazakhstan, *Malie Hidroelektrostancii (Small Hydropower Plants)* (Astana: Mint.gov.kz, n.d), accessed March 15, 2013, <http://www.mint.gov.kz/index.php?id=203&lang=ru>.

volume of household consumption from 10.9 to 18 billion m³.⁴⁵ The first section of the pipeline—Bozoy–Shymkent was launched in September 2013. The second section is expected to be completed by the end of 2015. The main problem with this plan, however, is that if all goes according to plan, it will take another 15 years to significantly increase household gas consumption in southern Kazakhstan using its own resources. Besides, the Beineu–Bozoy–Shymkent gas pipeline, capable of supplying its gas to southern regions, is also expected to fill the Central Asia–China gas pipeline (CAGP), in which China has not only taken part, but also covered most of the construction expenses. Chinese interests in moving gas out of the region may overshadow Kazakhstan’s desire to supply a sufficient amount of gas to its southern regions.

Addressing Energy Inefficiency

Kazakhstan’s economy is energy intensive. The subsidized energy sector does not provide incentive for industry and the population to efficiently use energy resources. President Nursultan Nazarbayev has remarked, “in Kazakhstan nobody saves anything, because electricity, heat and gas flow cheaply.”⁴⁶ Currently, 50 enterprises consume 40 percent of all energy.⁴⁷ Since there is the potential to decrease energy consumption by these enterprises by 30–40 percent,⁴⁸ the government has decided to promote energy efficiency initiatives. Energy efficiency reforms, especially in the industrial sector, require considerable investments that can hardly be pulled out

⁴⁵ Government of the Republic of Kazakhstan, *Koncepciya Razvitiya Gazovogo Sektora Respubliki Kazaxstan do 2030 Goda (Gas Sector Development Concept of the Republic of Kazakhstan until the period of 2030)*, Online.zakon.kz, December 5, 2014, http://online.zakon.kz/Document/?doc_id=31641775.

⁴⁶ International Crisis Group, *Central Asia: Decay and Decline* (Asia Report 201, 2011), 34.

⁴⁷ Government of the Republic of Kazakhstan, *50 Enterprises Consume 40 Percent of All Energy in Kazakhstan* (Astana: Government.kz, 2014), accessed October 1, 2014, <http://ru.government.kz/index.php/en/novosti/17316-50-enterprises-consume-40-percent-of-all-energy-in-kazakhstan.html>.

⁴⁸ Government of the Republic of Kazakhstan, “50 Enterprises Consume 40 Percent.”

of the budget in the short-term. Since 80 percent of electricity is generated by coal-fired TPPs, it is also important to introduce clean coal technologies or develop renewable energy sector.

An Image of “Green Energy” Advocate

Kazakhstan is the only country in the region that has adopted a long-term strategy—“Kazakhstan–2050”—with a particular focus on diversification of energy sources in the overall energy consumption. Among 10 global challenges of the twenty-first century, Kazakhstan highlighted three related to resources: deficit of water (fourth challenge); global energy security (fifth challenge); and decreasing amount of fossil fuels (sixth challenge).⁴⁹ However, very few experts dare to predict how Kazakhstan’s energy sector will look 35 years from now and most of them are sceptical about its ability to achieve set goals such as increasing RES up to 50 percent of the total energy consumption by 2050.⁵⁰ Currently, 80 percent of electricity is still generated by coal-fired TPPs, while the share of RES is less than 1 percent.⁵¹

The renewable energy potential of the country is high (wind power—1.3 trillion kWh per year in the Jungar Gates alone; and, solar power—annually 340 billion tons of reference fuel).⁵² Nursultan Nazarbaev, the President of Kazakhstan, has been the main advocate for green energy development in Central Asia.⁵³ However, his latest statement left everyone quite confused. During the XI Forum of Interregional Cooperation, Nazarbaev claimed “personally, I do not believe in alternative energy, including wind and solar energy. Oil and gas is our biggest

⁴⁹ Ministry of Defense of the Republic of Kazakhstan, *Strategy “Kazakhstan–2050”: New Political Course of the Established State* (Astana: address by the President of the Republic of Kazakhstan, Nursultan Nazarbaev, 2012), accessed July 1, 2014, <http://www.mod.gov.kz/mod-en/index.php/address-by-the-president-of-the-republic-of-kazakhstan-leader-of-the-nation-nnazarbayev-strategy-kazakhstan-2050-new-political-course-of-the-established-state>.

⁵⁰ Rashidova, Personal Interview.

⁵¹ International Renewable Energy Agency, *Renewable Energy Country Profile—Kazakhstan* (Abu Dhabi: IRENA, n.d.), accessed December 1, 2014, <http://www.irena.org/REmaps/countryprofiles/asia/Kazakhstan.pdf>.

⁵² “Sound Logic Behind Renewable Expansion” *Invest in Kazakhstan 2013*, 82.

⁵³ “Kazaxstanu Nujen Institute po Voprosam ‘Zelenoy’ Energetiki (Kazakhstan Needs an Institute on ‘Green’ Energy Issues),” *Kazenergy*, October 11, 2013, accessed March 5, 2014, <http://kazenergy.com/ru/press/2011-04-21-10-24-20/11309-----qq--.html>.

advantage and there should not be a fear of us being a resource-country. It is good that we have these resources, which we will be exporting and generating revenues.”⁵⁴ It became obvious that the government does not see any urgency in developing RES in Kazakhstan, except for improving its image.⁵⁵ In this sense, the question of whether Kazakhstan is an example for other Central Asian states to follow in terms of RES development remains open.

One of the major challenges along the way toward developing RES in Kazakhstan is the tactic that energy-purchasing companies use. These companies are forced by the government to purchase electricity produced using new technologies at a higher price to keep the incentive to develop RES. Having contradicted those companies economic interests, most of the RES projects are being compromised by these companies. Thus, achieving the goal of 50 percent RES in the overall energy balance by 2050 seems problematic, argues Almaz Akhmetov.⁵⁶

Energy Sector of Kyrgyzstan

Kyrgyzstan has the potential to produce annually up to 142.5 billion kWh of hydroelectricity, which places it third after Russia and Tajikistan among post-Soviet countries.⁵⁷ That is why hydro power is considered a priority direction in the development of Kyrgyzstan’s energy sector. The share of hydroelectricity in the overall electricity production of Kyrgyzstan

⁵⁴ S. Pashkova, “Prezident Kazaxstana Priznalsya, Chto Ne Verit v Alternativnuyu Energetiku (President of Kazakhstan Admitted that He Does not Believe in Alternative Energy),” *Vlast.kz*, September 2014, accessed December 1, 2014,

[http://vlast.kz/article/prezident_kazahstana_priznalsja_cho_ne_verit_v_alternativnuju_jenergetiku-7678.html#gsc.tab=0&gsc.q=%D1%84%D0%B0%D1%80%D1%85%D0%BE%D0%B4&gsc.sort=.](http://vlast.kz/article/prezident_kazahstana_priznalsja_cho_ne_verit_v_alternativnuju_jenergetiku-7678.html#gsc.tab=0&gsc.q=%D1%84%D0%B0%D1%80%D1%85%D0%BE%D0%B4&gsc.sort=)

⁵⁵ Daniyar Kosnazarov, Head of the Department for Central Asia and Caucasus Studies, The Library of the First President of the Republic of Kazakhstan – The Leader of the Nation, Personal Interview, Almaty, Kazakhstan, March 18, 2014.

⁵⁶ Almaz Akhmetov, Expert at Regional Environmental Center of Central Asia, Skype Interview, July 26, 2013

⁵⁷ Regional Economic Cooperation in Central Asia, “Electric Energy,” *Final Report RETA 5818* (2000): 14, <http://www.docstoc.com/docs/19688087/Electric-Energy#top>.

accounted for 60–65 percent in 1990, but reached 90 percent in 1998.⁵⁸ Currently, 90 percent of electricity in Kyrgyzstan is generated by HPPs and only 10 percent by TPPs in the Osh region. Ninety percent of hydroelectricity is generated by a set of cascades on the Naryn Trans-boundary River, which nourishes Kyrgyzstan, Tajikistan, Uzbekistan, and Kazakhstan.⁵⁹

During the Soviet period, major hydro-power development projects were designed mainly by the Tashhydroproject Institute in Tashkent, Uzbekistan. The Upper Naryn cascade consists of eight HPPs: Oruktam–1, Oruktam–2, Ekinaryn, Dzhanikel, Akbulun, Naryn–1, Naryn–2, and Naryn–3. The process of utilizing the hydro-power potential of the Naryn River started in the 1950s. The general plan of Naryn–1 HPP was developed in the Tashhydroproject Institute in 1992. The middle Naryn cascade consists of three stations: Kambarata–1, Kambarata–2, and Kambarata–3 HPPs.⁶⁰

Currently, the largest amount of electricity production comes to the HPP cascade in the Toktogul reservoir. Toktogul HPP has a capacity of 1200 MW and covers one-third of the total installed power capacity of 3786 MW. However, the last time Toktogul was filled (19.5 billion m³), allowing the Kyrgyz government to export a significant volume of electricity to neighbouring Kazakhstan was 2010.⁶¹ The water level in Toktogul is currently dropping. It was expected that it would drop below the electricity production level (7 billion m³) by April 2015. The water level in the dam has indeed reached a critically low level. Taking into account the fact

⁵⁸ U. A. Mateev and G. B. Anderson, “Energetika Kirgizskoy Respubliki i Puti Ee Razvitiya (Energy Sector of Kyrgyz Republic and Its Development Paths),” *REFORMA*, February 1999, accessed February 1, 2014, http://journals.manas.edu.kg/reforma/oldarchives/1999-2-2/8_1540-3762-1-PB.pdf.

⁵⁹ Ernest Karibekov, “Est li Rinok Elektroenergii v Kirgizstane, Chast 1 (Is There an Energy Market in Kyrgyzstan, Part 1),” *Analitika*, January 17, 2014, accessed September 1, 2014, <http://analitika.akipress.org/news:4952>.

⁶⁰ Electric Power Stations, *Elektricheskie Stancii (Electric Power Stations)*, (Bishkek, n.d.), accessed January 27, 2015, <http://www.energo-es.kg/?page=articles&read=18>.

⁶¹ Vladimir V. Kouzmitch, “Strengthening Cooperation of Central-Asian Countries in Using Advanced Technologies in Energy Efficiency and Renewable Energy Sources,” *Project of the United Nations Economic Commission for Europe*, 2013, 31, accessed May 15, 2015, http://www.unece.org/fileadmin/DAM/energy/se/pdfs/gee21/projects/AdvTech_IncreasingCooperation.pdf.

that it takes up to 9 billion m³ to use its full power generation capacity, the water level in the reservoir should not decrease below 15 billion m³.⁶²

There is a huge potential to increase hydroelectricity production in Kyrgyzstan. Technically and economically, the most promising projects considered by the government are Kambarata–1 and –2 HPPs, which were developed by Tashhydroproject Institute back in 1980s. Construction of the Kambarata–2 project started in 1986 and stopped after the disintegration of the Soviet Union. The construction process was restarted in 2003 and the first electric power generating aggregate with a capacity of 120 MW started operating in 2010. The governments of Kyrgyzstan and Russia signed an agreement on building Kambarata–1 HPP on February 3, 2009.⁶³ The Kyrgyz government highlights that there is a possibility to build 7 more cascades with 33 hydro-power stations on the Naryn River. This set of HPPs will have a capacity of 6450 MW, capable of generating 22 billion kWh of electricity annually.⁶⁴

However, Kyrgyzstan's electric power sector consists almost completely of water run-of-river type HPPs,⁶⁵ which can generate electricity mostly in the summertime. To meet its winter electricity needs, the Kyrgyz government has to either develop its own limited fossil fuel potential and build TPPs or secure stable thermal electricity import from neighbouring states. Construction of the Kara–Keche coal-fired TPP is considered to be one of the most promising projects to ensure electricity supplies to the northern parts of the country. Kara–Keche coal-fired TPP is located 50 km from Chaek, Naryn region. Kara–Keche TPP's technical and economic

⁶² “Toktogulskaya GES Mojet Ostanovitsya k Vesne 2015 Goda (Toktogul HPP Can Stop Operating by Spring 2015),” October 2014, accessed January 1, 2015, <http://www.stanradar.com/news/full/12811-toktogulskaja-ges-mozhet-ostanovitsja-k-vesne-2015-goda.html>.

⁶³ Electric Power Stations, *Elektricheskie Stancii: Kambarata-1* (Electric Power Stations: Kambarata-1) (Bishkek: Electric Power Stations, 2014), accessed February 2, 2015, <http://www.energo-es.kg/?page=article&read=43>.

⁶⁴ Electric Power Stations, *Investicionnie Proekti (Investment Projects)* (Bishkek: Electric Power Stations, n.d), accessed December 1, 2014, <http://www.energo-es.kg/?page=articles&read=6>.

⁶⁵ Water run-of-river type HPP does not require the use of a dam and generates electricity by channeling a portion of a river through a canal or penstock. See “Types of Hydropower Plants,” *Energy.gov*, <http://energy.gov/eere/water/types-hydropower-plants>.

feasibility was studied back in 1979–1983 and, according to some estimates, has a higher electricity production coefficient than any other hydro-power generating facility.⁶⁶

Kyrgyzstan is short on funds and is counting on foreign investors to contribute to the development of the country's hydro-power potential. Russian RusHydro is engaged in the construction of the Upper Naryn cascade and building of Kambarata–1. The Chinese company SINOHYDROLtd cooperates with the Kyrgyz government on the construction of the Susamir–Kokomeran HPP (which has a capacity of 1305 MW). The Asian Development Bank is assisting in the modernization of the Toktogul HPP (which has a capacity of 1200 MW).⁶⁷

Table 15: Major Hydro-power and Thermal Power Plants of Kyrgyzstan⁶⁸

Object	Number of aggregates	Installed capacity, MW	Average production capacity, million kWh	Investment needed, million US\$	Approximate construction time
Susamir–Kokomeran HPPs cascade					
Karakol HPP	2	33	104	257,84	2015-2017
Kokomeran – 1 HPP	4	360	904	1607,8	2014-2017
Kokomeran – 2 HPP	4	912	2412	1478,1	2014-2021
Upper Naryn HPPs cascade					
Akbulun HPP	2	100	372	137	2017-2019
Naryn–1 HPP	4	62	227	85	2014-2016
Naryn–2 HPP	2	60	235	82	2015-2017
Naryn–3 HPP	2	60	254	82	2017-2019
Middle Naryn HPP cascade					
Kambarata–1 HPP	4	1600	5164	2568	2015-2021
Kambarata–2 HPP	3	360	1148	188	2013-2019
Kara–Keche TPP					
Kara–Keche TPP	4	1400	9600	2183	2014-2022

⁶⁶ Joormat Otorbaev, “Problemi i Potencial Razvitiya Elektroenergetiki v Kirgizskoy Respubliki (Problems and Perspectives for the Development of Power Sector in Kyrgyzstan),” (Government of Kyrgyz Republic, 2014), accessed December 4, 2014, <http://www.gov.kg/?p=41665&lang=ru>.

⁶⁷ Electric Power Stations, *Sotrudnichestvo s Zarubejnimi Partnerami (Cooperation with Foreign Partners)*, (Bishkek: Electric Power Stations, n.d), accessed December 3, 2014, <http://www.energo-es.kg/?page=articles&read=7>.

⁶⁸ Electric Power Stations, “Electric Power Stations.”

Kyrgyzstan: Mitigating Energy Crisis

Unlike oil- and gas-rich Kazakhstan, Kyrgyzstan only enjoys significant hydro-power potential, which is yet to be fully developed. With seasonal electricity production variations and an underdeveloped fossil fuel sector, it is the coordinated operation of the CAPS and import of gas and oil products from Central Asian downstream countries that ensured Kyrgyzstan's energy security. Thus, Uzbekistan's withdrawal from the CAPS and decreasing gas import has negatively affected the level of energy security in the country. As a consequence, the Kyrgyz government was forced to prioritize mitigating the energy crisis by equally distributing available energy resources and reliance on Kazakhstan and Russia to meet its winter energy demands. Currently, energy production capacity does not allow Kyrgyzstan to meet its energy needs all year round on its own. Thus, ensuring stable and reliable import of natural gas and thermal electricity from the neighbouring states remains an important aspect of Kyrgyzstan's energy policy.

Energy Crisis

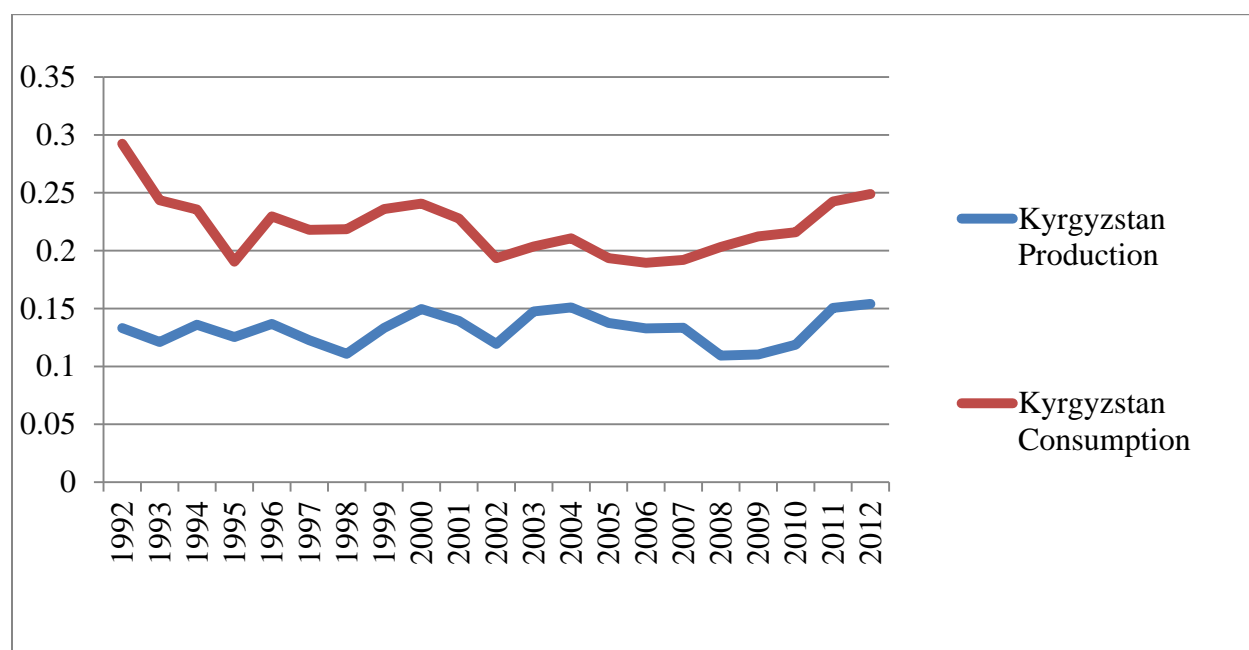
Hydro power is the main source of electricity production in the country. Kyrgyzstan's electric power sector is dependent on run-of-river type HPPs constructed along the Naryn River. The largest hydroelectricity-producing facility is Toktogul. Toktogul may not have the largest HPP in terms of power production capacity (1200 MW) in Central Asia, but it is the only reservoir capable of accumulating enough water to produce electricity in both the summer and winter months. The biggest reservoirs in Central Asia are Toktogul (19.5 km³) in Kyrgyzstan, and Nurek (10.5 km³) and Kairakum (4.16 km³) in Tajikistan.⁶⁹ However, overuse of water in

⁶⁹ Food and Agriculture Organization of the United Nations, "Aral Sea Transboundary River Basin," *Aquastat website*, 2012, 11, accessed May 1, 2015, <http://www.fao.org/nr/water/aquastat/basins/aral-sea/index.stm>.

Toktogul to produce electricity in 2013–2014 and the reduced water flow from the mountains relative to previous years has resulted in a water level drop in the reservoir and affected near-future prospects for increasing electricity production. The level of water release to downstream countries during that period remained within the range of previously agreed quotas. It is unclear though how the water drop will affect the volume of water release in the years ahead. Kyrgyzstan produced 14 billion kWh in 2014 and consumed it all. It is expected that the country will only produce 11.6 billion kWh in 2015, while the consumption needs will amount to 15.8 billion kWh in 2015.⁷⁰

The production of primary energy resources in the country has never met its consumption level, which implies that any further drop of energy production will worsen the energy crisis.

Figure 3: Primary Energy Production and Consumption (quadrillion BTU) of Kyrgyzstan⁷¹



⁷⁰ Otorbaev, “Problems and Perspectives for the Development of Power.”

⁷¹ US EIA, *International Energy Statistics: Kyrgyzstan* (Washington, DC: US EIA, n.d), accessed January 5, 2015, <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=44&pid=44&aid=1&cid=KG,&syid=1992&eyid=2012&unit=QBTU>.

The decreasing gas supply from neighbouring countries also severely affected Kyrgyzstan's energy security. Kyrgyzstan possesses less than 10 billion m³ of proven gas reserves.⁷² Having produced 30 million m³ of gas, it imported the remaining 270 million m³ in 2013.⁷³ Kyrgyzstan imports 90 percent of its domestically consumed energy from Uzbekistan and Kazakhstan.⁷⁴ Despite the fact that gas supply from Uzbekistan to Kyrgyzstan decreased from 800 million m³ in 2000 to 280 million m³ in 2013, Uzbek gas still remains the main source of gas imports.⁷⁵

Ensuring Human Energy Security

Having experienced two civil uprisings, the government of Kyrgyzstan is particularly concerned about the social and political instability that a shortage of electricity may lead to. Kyrgyzstan consumes on average 22–23 million kWh of electricity during warm summer days and 70 million kWh during cold winter days and most of it goes to household consumption. Kyrgyz households consumed 4.2 billion kWh of electricity, which accounted for 30 percent of the overall production, in 1999. The level of electricity consumption by the household sector reached 7.2 billion kWh, constituting 63 percent of the overall electricity production in the country, in 2012.⁷⁶ Due to a significant water drop in the reservoirs, the government of Kyrgyzstan was forced to limit electricity consumption by 30 percent of the total consumption volume in the previous year from October 1, 2014 to March 31, 2015.⁷⁷ This implies that an

⁷² British Petroleum Company, *BP Statistical Review*.

⁷³ Eni, *World Oil and Gas Review for 2014*.

⁷⁴ "Uzbek Gas Supplies to Southern Kyrgyzstan Resumed," *The Times of Central Asia*, December 31, 2014, accessed March 3, 2015, <http://www.timesca.com/news/14814-uzbek-gas-supplies-to-southern-kyrgyzstan-resumed>.

⁷⁵ Otorbaev, "Problems and Perspectives for the Development of Power."

⁷⁶ Ibid.

⁷⁷ Ivan Donis, "S 1 Oktyabrya v Kirgizii Vvodyatsya Veernie Otklyucheniya Sveta (Kyrgyzstan is Introducing Rolling Blackouts Starting from October 1, 2014)," *News-Asia*, August 13, 2014, accessed March 3, 2015, <http://www.news-asia.ru/view/ks/6991>.

inability to produce sufficient electricity does not only hit the economy, but also affects the country's ability to meet basic human needs.

Reliance on Support from Russia and Kazakhstan

With a very strong Russian lobby and relatively good relationships with Kazakhstan, the Kyrgyz government is now counting on these two actors to secure stable and adequate supplies of energy, especially in winter. The Russian lobby forced the Kyrgyz government to repeal the law prohibiting bailing out strategic facilities of the country. As a result, Russia ratified an agreement with the Kyrgyz government, according to which the entire gas sector of Kyrgyzstan (including the national company Kyrgyzgaz, gas pipelines, gas-distributing stations, and underground gas storage facilities) was sold to Gazprom for US\$1 in return for forgiveness of state debts.⁷⁸ Most importantly, however, Kyrgyz government was counting on Gazprom to serve as a middleman between importing Kyrgyzstan and exporting Uzbekistan to ensure stable gas supplies. Critics of the deal fear excessive political leverage over the country that selling Kyrgyzgaz gives to Russia. “Kyrgyzstan needs gas, not Kyrgyzgaz” said in one of his speeches Melis Erzhigitov, a spokesman for Prime Minister Zhanoro Satybaldiyev, as a reply to the criticism in 2013. He also added “Gazprom will provide the country with an uninterrupted supply of gas and maybe even for a cheaper price.”⁷⁹ Aleksey Miller, a Gazprom chairman, describing the deal promised that the company “[now] guarantees a stable gas supply” to Kyrgyzstan.⁸⁰

⁷⁸ “Uzbekistan Prekratil Podachu Prirodnogo Gaza na Yug Kirgizii (Uzbekistan Stopped Gas Supply to Southern Kyrgyzstan),” *Kazenergy*, July 18, 2013, accessed November 5, 2014, <http://kazenergy.com/ru/press/2011-04-21-10-41-35/10102-2013-07-17-20-23-18.html>.

⁷⁹ Asel Kalybekova, “Kyrgyzstan: Is Gazprom Deal a Blessing or Curse for Bishkek?” *Eurasianet.org*, July 31, 2013, accessed September 1, 2014 <http://www.eurasianet.org/node/67327>

⁸⁰ Murat Sadykov, “After Gazprom Takeover, Southern Kyrgyzstan Marks 24th Day Without Gas,” *Eurasianet.org*, May 7, 2014, accessed January 15, 2015 <http://www.eurasianet.org/node/68347>; Gazprom, “Gazprom Kyrgyzstan to

Kyrgyzstan is receiving certain preferences. Kazakhstan agreed to export 1.4 billion kWh of electricity to Kyrgyzstan generated in Zhambyl TPP in 2014. This electricity was produced from 330 million m³ of imported Uzbek gas, which was supplied by Gazprom, the Russian gas company, in 2014.⁸¹ While Uztransgaz exported gas to Kyrgyzstan for US\$290 per 1,000 m³ in 2013, the prices for Kazakh and Russian gas were lower, US\$224 per 1,000 m³ and US\$160 per 1,000 m³, respectively.⁸² On September 20, 2012, the governments of Russia and Kyrgyzstan signed an agreement on the building and exploitation of the Upper Naryn cascade HPPs (Akblun HPP, Naryn HPP-1, Naryn HPP-2 and Naryn HPP-3). Most importantly, Kyrgyzstan is counting on Russian support to build Kambarata-1 HPP,⁸³ the project designed to considerably increase winter electricity production volume. However, the extent to which Russia is willing to get involved in rather big and at the same time controversial HPP projects is unclear. Moreover, the current ruble crisis and Western sanctions effectively takes this plan off the table at the moment.

Fighting Corruption and Energy Inefficiency

Decreased gas and thermal electricity supplies from abroad forced the government of Kyrgyzstan to pay greater attention to the problem of electric power sector inefficiency. Fifty-three percent of electric power generation facilities in the country are over 40 years and 37 percent are over 30 years old.⁸⁴ Current total loss in the electric power system of Kyrgyzstan is almost 40 percent, out of which 25 percent (3.3 billion kWh per year) is commercial losses and

provide reliable gas supply to Kyrgyz Republic,” *Gazprom official website*, August 27, 2014, accessed January 15, 2015 <http://www.gazprom.com/press/news/2014/august/article199715/>.

⁸¹ “Gazprom Videlit Dopolnitelnie 330 mln. Kubometrov Gaza Kirgizstanu (Gazprom will Supply Additional 330 mcm of Gas to Kyrgyzstan),” *TREND*, October 27, 2014, accessed December 1, 2014, <http://www.trend.az/casia/kyrgyzstan/2326511.html>.

⁸² Julia Kostenko, “Gazprom: Dreams Don’t Come True?” *24.kg news agency*, September 10, 2014, accessed December 1, 2014, <http://www.eng.24.kg/economics/172141-news24.html>.

⁸³ Commonwealth of Independent States, “On the Development of Cooperation of CIS.”

⁸⁴ Otorbaev, “Problems and Perspectives for the Development of Power Sector.”

thefts. Technical losses account for the remaining 15 percent.⁸⁵ The current Kyrgyz government has partially built its legacy on blaming the previous (Kurmanbek Bakiyev) administration for the appropriation of money devoted to Kyrgyz energy sector development. The new government openly acknowledges the importance of fighting the corruption that negatively affects Kyrgyzstan's ability to address energy efficiency problems in a timely and effective manner. Even though so far the government has achieved little progress, unlike other Central Asian leaders that have been in power for decades, new Kyrgyz authorities at least elevated this problem to the state-priority policy level.⁸⁶

Shortcomings of the National Priority Energy Project

To overcome the consequences of uneven distribution of electricity, the Kyrgyz government has recently put into force the Datka electric power station and complete the Datka–Kemin electric power transmission line connecting the southern and northern parts of the country.⁸⁷ However, the energy security of Kyrgyzstan cannot be ensured without the cooperation of its neighbours. According to Nikolai Kravcov, member of the Monitoring Council under the Ministry of Energy, Kyrgyzstan will continue to experience electricity supply shortages due to lack of production. And even the Datka–Kemin electric power transmission line will not save Kyrgyzstan from an energy crisis. This transmission line solves the problem of

⁸⁵ N. Abdurasulova and N. Kravsov, “Electricity Governance in Kyrgyzstan: An Institutional Assessment,” *Civic Environmental Foundation UNISON*, 2009, 14.

⁸⁶ Aygul Sultanbekova, Former Advisor to the Government of Kyrgyz Republic on Power Sector Development, Personal Interview, Bishkek, Kyrgyzstan, February 7, 2014.

⁸⁷ Government of Kyrgyz Republic, *Premier-minister J. Otorbaev Poruchil Minenergopromu Zavershit Vse Podgotovitelnie Raboti k Otopitelnomu Period Strogo v Srok (Prime Minister Otorbaev instructed Minenergoprom to Complete All Preparatory Works for the Heating Period Strictly on Time)* (Bishkek: Gov.kg, 2014), accessed December 10, 2014, <http://www.gov.kg/?p=38756>.

transporting electricity, but does not add electric power-production capacity. And it will be a decade or two until Kambarata–1 is put into full operation.⁸⁸

Despite the fact that Kambarata–1 can considerably increase the volume of electricity production in the country, the current administration acknowledges that all claims that a single giant HPP can solve all energy security problems in Kyrgyzstan is an illusion. The electricity production coefficient of Kamabarata–1 is low.⁸⁹ Besides, every added 1 kW of new capacity will cost US\$2700, which Kyrgyzstan can hardly afford.⁹⁰

The cost of electricity production in Kambarata–1 (1900 MW capacity) is estimated to be higher than in the Kara–Keche coal-fired plant (800 MW). Despite its lower electric power capacity, the coal-fired plant operates year round, while the power production capacity coefficient of Kambarata–1 accounts for only 31.5 percent. Building the Kara–Keche TPP with the capacity of 700 MW by 2017 with the possibility to increase it up to 1400 MW and then 2800 MW⁹¹ might have a greater effect on the energy security of Kyrgyzstan.

For a limited Kyrgyz budget, building Kara–Keche is economically more efficient and thus, should be more attractive. Adding 1 kW of new power capacity costs around US\$1,500 in TPPs and around US\$2,000 in hydro-power plants. The government announced that the cost of Upper Naryn HPP exceeds US\$727 million. If this sum is divided by the capacity of 237 MW, the cost of 1 kW will reach US\$3,000, which is even US\$1,000 higher than the average in the country. Construction of Kamabarata–1 will cost Kyrgyzstan US\$5.2 billion. With a capacity of 1900 MW, this means 1 kW will cost US\$2,700. Ernest Karibekov, head of Research Institute

⁸⁸ N. Kravcov, “V Voprosax Energobezopasnosti Nam ne Oboytis Bez Sosedej, kak I im Bez Nas (To Ensure Energy Efficiency We Need Our Neighbors as Well as They Need Us),” *Fuel Energy Sector Transparency Initiative in Kyrgyz Republic*, January 2015, accessed February 15, 2015, http://www.energoforum.kg/index.php?act=view_material&id=447.

⁸⁹ Otorbaev, “Problems and Perspectives for the Development of Power.”

⁹⁰ Karibekov, “Is There an Energy Market in Kyrgyzstan?”

⁹¹ Otorbaev, “Problems and Perspectives for the Development of Power.”

for the Central Asian Water and Water-Energy Resources Problem Studies, believes that Kambarata-1 will not be constructed in the next 20 years. To return US\$5.2 billion in investments, this plant will have to operate fully, selling electricity for 8 cents per kWh. Kyrgyzstan now exports electricity for around 4 cent per kWh along with the water supply.⁹²

Kyrgyzstan's considerable hydro-power potential has yet to be developed. Although it suffered from gas supply cuts within the CAES, Kyrgyzstan succeeded in mitigating an energy crisis by selling its strategic gas facilities to external actors so that they can invest in modernizing the gas sector. Despite prioritizing hydro-power development in its energy policy, the Kyrgyz government decided to step away from aggressively promoting the Kambarata-1 project that is causing disagreement with Uzbekistan. Kyrgyzstan's neutral position over this project in combination with other policy initiatives has resulted in very limited, but nonetheless important, Uzbek gas and thermal electricity supply to the country.

Energy Sector of Tajikistan

Although it possesses huge potential for hydroelectricity production (more than 527 billion kWh annually—4 percent of the worldwide hydro-power potential), Tajikistan currently generates only 16.5 billion kWh per year (4–5 percent of the potential reserves) with installed capacity of 5190 MW. More than 98 percent of electricity is generated by HPPs (4872 MW).⁹³ Development of this potential could significantly contribute to sustainability of energy sector not only in Tajikistan, but also other Central Asian states, by providing large quantities of relatively inexpensive and “green” electricity. Currently, there are almost 300 small HPPs producing electricity in the country. According to the Government program, adopted in 2009 for the

⁹² Karibekov, “Is There an Energy Market in Kyrgyzstan?”

⁹³ Ministry of Foreign Affairs of the Republic of Tajikistan, *The Energy Sector of the Republic of Tajikistan*, (Dushanbe: Mfa.tj, n.d), accessed September 5, 2014, <http://mfa.tj/en/energy-sector/the-energy-sector-of-rt.html>.

construction of small HPPs for domestic and foreign investors for 2009–2020, Tajikistan is planning to build 189 more small HPPs to add an additional 103.6 MW.⁹⁴ While the construction of small and mini HPPs is among the priority areas in the program, it is the medium and large HPPs that can significantly contribute to electricity production in the country.

Of the more than 98 percent of electricity produced by HPPs, 97 percent of that electricity is generated by large and medium HPPs.⁹⁵ While small HPPs are mostly designed to meet the electricity demand of hundreds of people living in remote areas of the country, the planned Rogun HPP, with a capacity of 3600 MW to produce 13 billion kWh annually, may considerably increase the level of electricity production in Tajikistan. For the moment, Nurek is the largest HPP in Central Asia, with total production capacity of 3000 MW. The Nurek Dam was built between 1961 and 1980 and at 300 m is considered the tallest in the world. Another major complex of HPPs producing electricity in the country is Sangtuda–1 HPP, constructed by Russian companies in 2009, and Sangtuda–2, built by Iranian investments and with an expected capacity of 900 MW.⁹⁶

In addition to hydro-power resources, Tajikistan also possesses very limited fossil fuels. Its estimated coal reserves account for 4.5 billion tonnes. Tajikistan produced 500,000 tonnes of coal in 2013.⁹⁷ The government is also planning to develop 87 small oil and gas fields.⁹⁸ Proven

⁹⁴ Energy Charter Secretariat, *In-Depth Energy Efficiency Review Tajikistan* (Brussels: Energy Charter Secretariat, 2013), 74, accessed May 20, 2014, http://www.encharter.org/fileadmin/user_upload/Publications/Tajikistan_EE_2013_ENG.pdf.

⁹⁵ United Nations Development Program, *Sustainable Energy for All: Tajikistan: Rapid Assessment and Gap Analysis*, (UNDP, 2013), 6, accessed September 1, 2014, http://www.undp.org/content/dam/tajikistan/docs/library/UNDP_TJK_SE4ALL_Rapid_Assessment_and_gap_analysis_Eng.pdf.

⁹⁶ “Tajikistan—Energy,” *GlobalSecurity.org*—Reliable Security Information, accessed October 12, 2014, <http://www.globalsecurity.org/military/world/centralasia/tajik-energy.htm>.

⁹⁷ Ministry of Foreign Affairs of the Republic of Tajikistan, *The Energy Sector of the Republic of Tajikistan* (Dushanbe: Mfa.tj, n.d.), accessed September 5, 2014, <http://mfa.tj/en/energy-sector/the-energy-sector-of-rt.html>.

⁹⁸ President of the Republic of Tajikistan, *The Annual Message to the Majlisi Oli of the Republic of Tajikistan* (Dushanbe: President of the Republic of Tajikistan, 2011), accessed June 5, 2014, <http://www.prezident.tj/en/node/2189>.

gas reserves of Tajikistan are estimated at the amount of 10 billion m³, but its gas production level is extremely low.⁹⁹ Tajikistan produced less than 10 million m³, while consumed 140 million m³ of gas in 2012 and imported the rest from Uzbekistan.¹⁰⁰ Complete gas supply disruptions from Uzbekistan in 2013 had a tremendous impact on energy security of Tajikistan. The government of Tajikistan cooperates with 15 energy companies to develop its oil and gas potential and deal with energy crisis.¹⁰¹ Most of all, Tajikistan is counting on newly explored Sarikamysh and West Shokhambary gas fields, which according to the preliminary estimates by the Gazprom may possess around 70 billion m³ [not proven yet] of gas.¹⁰² However, the fact that 94 percent of the country is mountainous area (geographic constraint) makes it extremely difficult and costly to extract and transport natural gas in Tajikistan thus turning the whole fossil fuel sector not quite attractive to foreign investors. For instance, the Shakhrinav–1P well has a planned depth of 6,300 meters, a deepest well in Central Asia and require significant upfront investments.¹⁰³

Tajikistan: In Pursuit of an Independent Energy System

Tajikistan's domestic energy production almost completely relies on hydro-power sector development. The hydro-power potential to produce renewable and clean electricity provides Tajikistan certain leverage. However, due to seasonal variation in hydroelectricity production and limited fossil fuel reserves Tajikistan has never been able to meet its electricity needs all

⁹⁹ British Petroleum Company, *BP Statistical Review*.

¹⁰⁰ Eni, *World Oil and Gas Review for 2014*.

¹⁰¹ President of the Republic of Tajikistan, *The Annual Message to the Majlisi Oli of the Republic of Tajikistan* (Dushanbe: President of the Republic of Tajikistan, 2011), accessed March 4, 2014, <http://www.prezident.tj/en/node/2189>.

¹⁰² "Tajikistan Strategic Partnership," *Gazprom official website*, n.d, accessed May 5, 2015, <http://www.gazprom.com/about/production/projects/deposits/tajikistan/>.

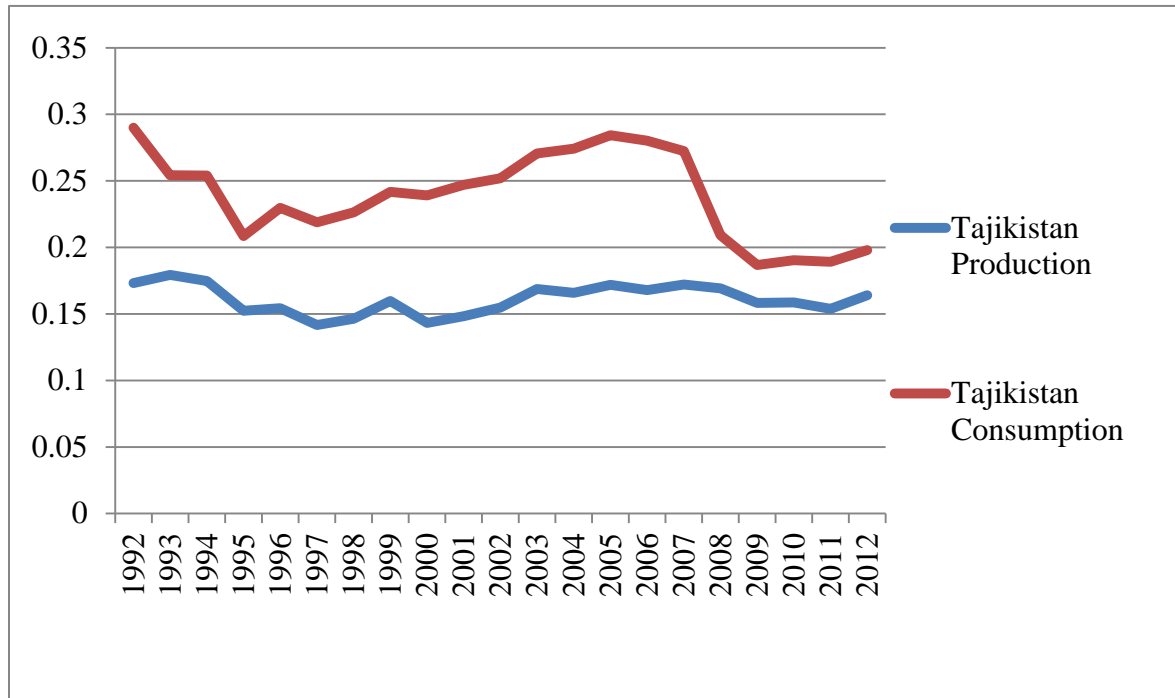
¹⁰³ "Tajikistan," *Gazprom International*, n.d, accessed March 3, 2015, <http://gazprom-international.com/en/operations/country/tajikistan>.

year round. Like all other Central Asian republics, Tajikistan's energy sector was designed to operate within the CAES. Uzbekistan's withdrawal from the CAPS and the cut of gas and thermal electricity supply left Tajikistan in complete isolation and severely affected the level of its energy security, especially in winter months. To free itself from high dependence on neighbouring Uzbekistan, the government of Tajikistan has decided to establish countrywide (north-south) electricity transmission lines, since within the CAPS some regions of the country were only connected to the electric power grid of Uzbekistan, and increase electricity production by attracting investments to share the construction cost of the Rogun dam and HPP. While establishing an independent electric power system and a construction of Rugun HPP are the number one energy policy priority for Tajikistan, mitigating the current energy crisis by increasing efficiency of electricity producing and consuming facilities and development of the small hydro-power sector seem to be considered important as well. However, my analysis shows that there are limited opportunities for Tajikistan to ensure its energy security on its own in the short- to medium-term.

Establishing an Independent Energy System

Total primary energy production in Tajikistan has never matched the level of consumption. Within the CAES, Uzbekistan and Turkmenistan supplied insufficient thermal electricity, natural gas, and oil to Tajikistan. When the supply of these resources from its neighbour started to decrease, Tajikistan had no other choice but to rely on its own resources. The reduced level of total primary energy consumption for the last several years indicates that Tajikistan has not yet succeeded in covering the volume of previously imported energy.

Figure 4: Primary Energy Production and Consumption (quadrillion BTU) of Tajikistan¹⁰⁴



Complete isolation from the CAES with no other possibility to import energy resources forced the government of Tajikistan to pursue the development of an independent national energy system. Ensuring energy independence by connecting hydro-power rich regions (southern) with those that were connected to the CAES (northern) and development of its hydro-power and limited fossil fuels potential has three objectives:

- to meet the population's electricity needs year round;
- to give a powerful impetus to the economic development of the country; and
- to increase electricity export potential.

¹⁰⁴ US EIA, *International Energy Statistics: Tajikistan* (Washington, DC: US EIA, n.d), accessed January 5, 2015, <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=44&pid=44&aid=1&cid=TI,&syid=1992&eyid=2012&unit=QBTU>.

Tajikistan was completely cut off the electric power grids of Uzbekistan in 2011.¹⁰⁵ To supply electricity to its northern regions, the government decided to build 500 kV south–north and several 220 kV electricity transmission lines.¹⁰⁶ The 220 kV Lolazor–Khatlon line was finished in 2009.¹⁰⁷ These transmission lines, however, cannot solve the problem of winter electricity deficiency; therefore, the government of Tajikistan has prioritized the construction of the Rogun dam and HPP with the capacity to double the current electricity production volume, which would also allow hydroelectricity generation during the winter period. However, Uzbek authorities perceive this project as a threat to the water balance in the region and thus strongly oppose any progress in this direction. Hypothetically, hydro-power development in Tajikistan and meeting water needs in Uzbekistan should not necessarily be viewed as static. Tajikistan can potentially improve its energy security by fully developing huge hydro-power potential (527 billion kWh per year). In terms of water withdrawal per capita Uzbekistan is placed fourth in the world after Turkmenistan, Iraq and Guyana, and has a potential to reduce domestic consumption of water.¹⁰⁸ Currently, however, Tajikistan’s ability to improve its energy security by developing hydro-power potential and Uzbekistan’s capability to reduce domestic water consumption, at least in the short-term perspective, face a number of obstacles associated with lack of financial resources, technological limitations and political constraints.¹⁰⁹

¹⁰⁵ Michael Becker, “Regional Energy Market in Central Asia,” *RESET*, May 2011.

¹⁰⁶ President of the Republic of Tajikistan, *Annual Address to the Majlisi Oli of the Republic of Tajikistan* (Dushanbe: President of the Republic of Tajikistan, 2008), accessed January 5, 2014, <http://www.prezident.tj/en/node/2191>.

¹⁰⁷ Ministry of Energy and Industry of the Republic of Tajikistan, *The Construction of Line Transfer Electricity 220 kV Lolazor-Khatlon* (Dushanbe: Minenergoprom.tj, n.d), accessed September 15, 2014, http://www.minenergoprom.tj/view_liniyae.php?id=3.

¹⁰⁸ Olli Varis, “Resources: Curb Vast Water Use in Central Asia,” *Nature*, October 1, 2014, <http://www.nature.com/news/resources-curb-vast-water-use-in-central-asia-1.16017>.

¹⁰⁹ Detailed Discussion of Water Needs for Uzbekistan and Challenges for Tajikistan to Develop its Hydropower Sector is Provided in the Following Sections.

The Soviet gas pipeline system was constructed in a way that all gas transport infrastructures to Tajikistan passed Uzbek territory. Uzbekistan was and still remains major supplier of gas to Tajikistan. Thus, the country has been experiencing severe gas shortage since 2013, when Uzbekistan completely stopped gas supplies to Tajikistan.¹¹⁰ Tajik authorities may potentially count on Line-D of the CAGP, expecting that China will agree to leave a certain amount of gas for Tajikistan to meet its gas needs, especially during the winter period. According to the initial design, however, Line-D is being built to transport gas to China, using both Kyrgyzstan and Tajikistan as transit countries only. In fact, all participants of the project try to keep the question of turning Line-D into a source of gas supply to Central Asian upstream states off the table for the moment. The biggest concern still lies with Uzbekistan—a key transit country that does not refrain from using gas as a weapon to influence the foreign policies of its upstream neighbours. While Uzbekistan will no longer possess a legal right to unilaterally stop natural gas flow, because its section of pipeline is operated by Joint Venture Company, it still can physically cut supplies as all pipelines pass through its territory. Uzbekistan opposes construction of large dams, because it fears that its upstream neighbours could interfere with the water supply necessary for the downstream irrigation and particularly cotton industry, which accounts for 9 percent of total exports of the country and quite important for the livelihood of the people.¹¹¹ It has been using the dependence of Kyrgyzstan and Tajikistan on Uzbek gas as a political and economic instrument to block the construction of those dams. Gas supply to Central Asian upstream countries from the CAGP will decrease energy leverage of Uzbek authorities in relations with its upstream neighbours and may thus cause tensions between Uzbekistan and

¹¹⁰ “Uzbekistan Halts Gas Supply to Tajikistan from January 1,” *The Times of Central Asia*, December 25, 2012, accessed Jun 25, 2014 <http://www.timesca.com/news/10619-uzbekistan-halts-gas-supply-to-tajikistan-from-january-1>.

¹¹¹ Central Asia Data Gathering and Analysis Team, “Trade Policies and Major Export Items,” 12.

China. So, China would most likely try to avoid any conflict with Uzbekistan. In this regard, until the energy-water nexus dispute between Central Asian downstream and upstream countries is resolved, counting on the Line–D pipeline as a source of gas supply to Tajikistan and potentially Kyrgyzstan would be problematic.

Dealing with the “High Cost” of Energy Security

Tajikistan cannot afford to bear the cost of the transition to an independent energy system on its own. The cost of energy consumption already accounts for around 60 percent of the GDP. Households in Tajikistan spend around 50 percent of their total income on energy in the winter months and still receive an amount insufficient of fully meeting their needs.¹¹² While the Rogun HPP can solve the problem of seasonal variation and deficiency of electricity production, disagreement between Central Asian upstream and downstream countries over this project affects the majority of investment proposals. Uzbekistan fears that the proposed highest dam would lead to: (a) unduly interruptions of water release; (b) safety of the dam can easily be jeopardized resulting in serious environmental, economic and social consequences for downstream countries. Due to tensions between Uzbekistan and Tajikistan as well as certain domestic economic constraints over this project foreign investors are not rushing to take part in the construction of the dam. Construction of Rogun started during the Soviet period, and now requires from US\$3–6 billion in additional investments. With a public campaign to collect money for building the Rogun dam, the government of Tajikistan succeeded in collecting US\$187 million. However, once collected, Tajik authorities had few initiatives to put the money toward.¹¹³ The government made it compulsory for citizens to purchase almost US\$700 worth of shares, which at the time exceeded the average annual income for most Tajik residents. It

¹¹² UNDP, “Sustainable Energy for All,” 10.

¹¹³ International Crisis Group, “Central Asia: Decay and Decline,” 42.

planned to collect around US\$600 million, but managed to collect less than 30 percent of this amount.¹¹⁴ This did not only fall short of the goal, but also was not enough to continue construction. Attracting foreign investments in energy projects and ensuring affordability of energy resources are among the priority policy areas for Tajikistan.

Development of Small Hydro-power Potential

According to the United Nations Development Programme (UNDP) report, more than 1 million people suffer from frequent and prolonged blackouts each winter in Tajikistan.¹¹⁵ The World Bank's estimates of the number of people suffering from electricity shortage during the winter are even higher and reach 70 percent of the population.¹¹⁶ People living in remote mountainous areas are the most vulnerable. Due to geographical constraints to establishing a countrywide network of electric power transmission lines, the most feasible way to bring electricity to these regions is to build small and mini HPPs at these sites. Over the last two decades, 310 small HPPs have been constructed in the country and 10 more are in the process. The government is planning to build an additional 190 small HPPs by 2020.¹¹⁷ However, while 98 percent of electricity generation comes from the hydro-power sector, 97 percent of it is produced in medium and large HPPs.¹¹⁸ This does not imply that building small HPPs is a failure, because they supply electricity to a number of remote areas, where connecting them to

¹¹⁴ Joao Peixe, "Tajikistan to Proceed with Rogun Hydroelectric Dam," *Oilprice*, August 28, 2011, accessed May 1, 2014, <http://oilprice.com/Latest-Energy-News/World-News/Tajikistan-to-Proceed-with-Rogun-Hydroelectric-Dam.html>.

¹¹⁵ World Bank Group, *Tajikistan's Winter Energy Crisis: Electricity Supply and Demand Alternatives* (Washington, DC: World Bank, 2013), accessed October 1, 2014, <http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:23319658~pagePK:64257043~piPK:437376~theSitePK:4607,00.html>.

¹¹⁶ World Bank Feature Story, *Study Shows TALCO's Potential to Save Energy*, 2013, accessed May 1, 2015, <http://www.worldbank.org/en/news/feature/2013/01/28/study-shows-talco-potential-save-energy>.

¹¹⁷ President of the Republic of Tajikistan, *Annual Address of the President (2014)*.

¹¹⁸ UNDP, "Sustainable Energy for All," 6.

the central electric power system would be costly. But it means that without the construction of large HPPs, Tajikistan will not be able to resolve its energy crisis.

Improving Energy Efficiency

Tajik authorities acknowledge that investment in increasing the efficiency of some outdated major hydroelectricity producing facilities in Tajikistan may hypothetically save some electricity. Nurek, the largest contributor to the electricity production of Tajikistan, was built in 1972. Kairakkum was constructed even earlier, in 1956.¹¹⁹ Due to a variety of factors, including inefficiently functioning electricity producing facilities, Tajikistan's electric power sector is not operating to its full capacity (see Table 16).

Table 16: Operating Electric Power Generating Plants in Tajikistan (January 1, 2012)¹²⁰

Name	Technical capacity, megawatt		
	Designed	Available	Operating
Nurek HPP	3,000	2,385	1,625.3
Baipaza HPP	600	450	273.5
Dushanbe thermal electric plant	198	100	4.9
Yavan thermal electric plant	120	–	–
Kairakkum HPP	126	104	83.8
The Vakhsh cascade of HPPs	285	211	139.61
The Varzob cascade of HPPs	25.36	8	7.1
Pamir Energy	42	39	37
MGES	13	11	10
Sangtuda HPP–1	670	670	440
Sangtuda HPP–2	110	110	40
Total	5,190	4,088	2,661.21

Tajikistan is counting on multilateral institutions' support (technical, financial and expertise) to reduce electricity loss. According to some estimates, electricity production and transportation losses can be reduced by 30 percent.¹²¹

¹¹⁹ President of the Republic of Tajikistan, *Annual Address* (2008).

¹²⁰ UNDP, "Sustainable Energy for All," 12.

¹²¹ Ibid., 1.

However, unless the problem of the TALCO aluminum plant, which consumes 40 percent of the electricity produced, is resolved, the electric power sector of Tajikistan will remain inefficient. TALCO consumed 5,480 GWh in 2009 and 6,460 GWh of electricity in 2011. The World Bank recommended Energy Efficiency Action Plan for TALCO, arguing that if implemented it would cut 20 percent of electricity and 37 percent of gas consumption by the plant.¹²² The government, however, remains quite sensitive to any significant reform initiatives that could affect current management system of the company. TALCO, one of the 10 largest aluminum smelters in the world, provides up to 70 percent of the country's foreign currency earnings,¹²³ which is 60 percent of total export of Tajikistan and generates 20 percent of GDP.¹²⁴ TALCO is gobbling up Tajikistan's electricity in a most non-transparent manner, so that the government can immediately collect rents off exporting aluminum. TALCO legal case in the London high court revealed information on how President Rakhmon's family and their associates profit from TALCO company management. John Helmer, a Moscow based journalist, who was closely following the court proceedings, calculated the Tajik state revenue loss at US\$1.145 billion in between 2005 and 2008 due to a particular trading scheme, which only benefited owners of the TALCO operating companies, including the family of the President.¹²⁵ In this regard, there is sometimes a trade-off between successful energy efficiency initiatives and personal gains of certain political groups in Tajikistan that prevents achieving progress in this direction.

¹²² World Bank Feature Story, *Study Shows TALCO's Potential to Save Energy*.

¹²³ Zarina Ergasheva, "Government Endorses the Plan for Restructuring TALCO," *Asia-Plus*, April 19, 2013, <http://news.tj/en/news/government-endorses-plan-restructuring-talco>.

¹²⁴ John Heathershaw, "Tajikistan Amidst Globalization: State Failure or State Transformation?" *Central Asian Survey* 30, no. 1 (March 2011): 157.

¹²⁵ John Helmer, "Tajik Aluminium Case Gets Nearer Judgment," *Dances with Bears*, 2 August 2008, <http://johnhelmer.net/?p=479> in John Heathershaw, "Tajikistan Amidst Globalization," 160.

Energy Sector of Turkmenistan

The history of the Turkmen energy sector dates back to 1913, when the first HPP started supplying electricity to very small population areas.¹²⁶ Gindikush HPP, with the capacity of 1.2 MW, has celebrated its 100 years anniversary two years ago and is still operational.¹²⁷ Hydroelectricity production, however, is currently almost completely absent in the total electricity production balance (0,02 percent) in Turkmenistan¹²⁸ and the electric power sector of Turkmenistan is entirely dependent on gas-fired TPPs.

The first gas-fired (combined heat and power) TPP in the country (Turkmenbashi) was put into operation in 1961 with initial capacity of 170 MW and has now reached a capacity of 420 MW. The process of connecting some remote areas of Turkmenistan to the central electric power grids was initiated in 1966. To establish a countrywide electric power system, it was decided to connect Ashgabat, Mary, and Charjou electric power grids in 1970. Ten years later, the formation of the centralized Turkmen electric power system was complete. Electricity generation on Mary TPP, with a capacity of 1685 MW, started operating in 1987. In 2011, it produced 9022 million kWh, accounting for 49.4 percent of total electricity production in the country. Currently, there are nine state electric power plants with a capacity of 3984.2 MW to produce electricity in Turkmenistan. Having withdrawn from the CAPS, Turkmenistan is now increasing its electricity production capacity by building new TPPs. The first TPP constructed after gaining independence is Seydi (combined heat and power) TPP, with installed capacity of

¹²⁶ Ministry of Oil Industry and Mineral Resources of Turkmenistan, *Ministry* (Ashgabat: Minenergo.gov.tm, n.d), accessed June 1, 2014, <http://www.minenergo.gov.tm/index.php/7-news/188-ministerstvo>

¹²⁷ “Elektroenergetika Turkmenistana” (Electric Power in Turkmenistan), 182, accessed March 1, 2015, <http://energo-cis.ru/wyswyg/file/Turkmenistan.pdf>.

¹²⁸ Yingnan Zhang, “World Small Hydropower Development Report 2013-Turkmenistan,” United Nations Industrial Development Organization (UNIDO) and International Center on Small Hydro Power (ICSHP), 2013, accessed March 2, 2015, http://www.smallhydropowerworld.org/fileadmin/user_upload/pdf/Asia_Central/WSHPDR_2013_Turkmenistan.pdf.

160 MW. Three electric power stations with overall capacity of 1643 MW were introduced in 2010. Balkanabad TPP, with a capacity of 380 MW, was put into operation in 2010. Dashoguz TPP and Axal TPP, both with a capacity of 254.2 MW, started operating in 2007 and 2010 respectively. Avaz TPP was put into operation in 2010, with a capacity of 254.2 MW.¹²⁹

Currently, Turkmenistan is exporting electricity to Iran, Turkey, and Afghanistan. Turkmenistan is exporting up to 2 billion kWh annually, which is 13–17 percent of total electric power production. Between 2007 and 2009, Turkmenistan exported electricity to Tajikistan in an amount of 1 billion kWh annually, but stopped due to Uzbekistan’s withdrawal from the CAPS. Currently, there are four main transboundary electricity transmission lines connecting Turkmen TPPs with Uzbekistan and Iran (See Table 17) and there is a potential to reinstate electricity trade with other Central Asian countries. The government of Turkmenistan is also planning to construct 500 kV “Mary–Atamurad–Andxoy” transmission line connecting its largest (Mary) TPP with Afghanistan and increase the capacity of the “Mary–Seraxs” transmission lines.¹³⁰

Table 17: Transboundary Electricity Transmission Lines of Turkmenistan¹³¹

	Transmission lines	Voltage (kV)	Length (km)	Capacity (MW)
Uzbekistan	Serdar–Karakul	500	100	1,000
	Cherdjev–Karakul	220	67	120
Iran	Balkanabad–Gonbad	220	311	300
	Shatlyk–Seraxs	220	112	160

So the electric power sector of Turkmenistan is completely dependent on gas-fired TPP and the country possesses sufficient amount of gas to meet its domestic demand. Turkmenistan, with the amount of 17.5 trillion m³, enjoys the fourth-largest natural gas reserves after Russia,

¹²⁹ Ministry of Oil Industry and Mineral Resources of Turkmenistan, *Ministry*.

¹³⁰ Ibid.

¹³¹ “Elektroenergetika Turkmenistana (Electric Power of Turkmenistan),” 183.

Iran, and Kuwait.¹³² The Turkmen government is even more optimistic suggesting the reserves of 24 trillion m³.¹³³ The country's first gas production infrastructure was put in place in the 1970s.¹³⁴ Turkmengaz, state gas company, is currently developing around 30 gas and gas condensate deposits, including such unique fields as Galkynysh, Dovletabad, Shatlyk, Malay, Kerpichli, Garashsizligin 10 yilligi, Gazlidepe, Bagadja, Garabil, Gurrubil, etc. Overall, gas extraction accounts for over 1000 gas wells in the country. In 2014 Turkmenistan produced 76 billion m³ and exported 45 billion m³.¹³⁵ On the XVII People's Council in 2006 the government adopted the "Oil and Gas Industry Development Programme of Turkmenistan for the period till 2030" according to which it is targeting to reach the volume of gas production in the amount of 230 billion m³ annually by 2030.¹³⁶ There is a potential for significantly increasing gas production in Turkmenistan, since having fourth largest gas reserves in the world, the volume of Turkmen gas production is almost 10 to 9 times lower than in the United States (728.3 billion m³) or Russia (578.7 billion m³).¹³⁷ Many experts, however, doubt that Turkmenistan can reach the targeted level due to lack of investments as well as technical and geographical constraints to reach external energy markets.

The development of natural gas is the priority area in Turkmenistan's energy sector. However, due to a large number of sparsely located population spots it is economically too costly to develop a countrywide gas supply network. The government has made certain progress in

¹³² British Petroleum Company, *BP Statistical Review*.

¹³³ The Ministry of Foreign Affairs of Turkmenistan, "Economy," n.d., accessed May 15, 2015, <http://www.mfa.gov.tm/en/turkmenistan/economy>.

¹³⁴ Institute of Strategic Studies and Analysis, *Centralnaya Aziya. Geopolitika i Ekonomika Regiona (Central Asia. Geopolitics and Economy of the Region)* (2010), 50, http://www.isoa.ru/docs/central_asia-book.pdf.

¹³⁵ Kurganguly Yaziev, "Potencial Turkmenistana po Narashivaniyu Eksporta Prirodnogo Gaza (Potential for the Gas Export of Turkmenistan)," *Ministry of Oil and Gas Industry and Mineral Resources Journal*, accessed June 1, 2015, <http://www.oilgas.gov.tm/publikatsii/item/329>.

¹³⁶ "Obespechenie Globalnoy Energobezopasnosti – Faktor Ustoychivogo Razvitiya (Global Energy Security is a Guarantor of Sustainable Development)," *Ministry of Oil and Gas Industry and Mineral Resources Journal*, May 28, 2015, accessed June 1, 2015, <http://www.oilgas.gov.tm/publikatsii/item/435>.

¹³⁷ British Petroleum Company, *BP Statistical Review*.

supplying majority of its population with gas. The Turkmen government initiated the construction of an “East–West” gas pipeline capable of transporting 30 billion m³ in order to increase the availability of natural gas to some distant parts of the country, as well as to raise its export capacity. However, a 770 km long pipeline starting from Mary going through Axal and ending at the Balkan regions will only be justified if extended gas extraction starts in the giant Galkynysh gas field with total reserves estimated at around 13.1 to 21.2 trillion m³.¹³⁸ This pipeline is designed to transport natural gas from Galkynysh field (south Yolotan, Osman, and Yashlar) to the western regions.¹³⁹ Turkmenistan is counting on recently explored (2006) giant Galkynysh gas field to significantly increase its gas production capacity, the first stage of production on which was commenced in 2013.¹⁴⁰ The “West–East” gas pipeline has integrated all major gas deposits in the country into a single system thus making it physically possible to increase export volume in all/any direction.¹⁴¹

Turkmengaz controls 90 percent of all hydrocarbon fields. The remaining 10 percent belongs to the state oil company Turkmenneft.¹⁴² According to the law adopted by the former Turkmen President, Saparmurat Niyazov, no energy assets can be privatized until 2020.¹⁴³ Even though Turkmenistan declared the country “open for business,” the Turkmen government reserved the right to develop its onshore fields itself. International oil companies are limited to exploration only. As well, the government officials decided to sign new service contracts and not

¹³⁸ Economist Intelligence Unit, “Turkmenistan Gas: Galkynysh Gas Output will Boost Growth in 2014,” September 24, 2013, accessed April 15, 2015, <http://performance.ey.com/wp-content/uploads/downloads/2013/10/EY-Performance-Turkmen-gas-and-growth.pdf>.

¹³⁹ “Global Energy Security is a Guarantor of Sustainable Development,” *Ministry of Oil and Gas Industry*.

¹⁴⁰ “Galkynysh Gas Field, Turkmenistan,” *Hydrocarbons-technologies*, n.d., accessed June 1, 2015, <http://www.hydrocarbons-technology.com/projects/-galkynysh-gas-field-turkmenistan/>.

¹⁴¹ “International Cooperation in the Turkmenistan’s Oil and Gas Sector: Achievements and Prospects,” *State News Agency*, November 20, 2014, accessed March 1, 2015, <http://tdh.gov.tm/en/official-news-2/12015-2014-11-20-16-17-00>.

¹⁴² Institute of Strategic Studies and Analysis, *Central Asia. Geopolitics*, 50.

¹⁴³ International Crisis Group, “Central Asia: Decay and Decline,” 25.

the PSAs.¹⁴⁴ Companies that still operate within the PSA signed their agreements back in the 1990s. However, the fuel complex development of Turkmenistan is largely dependent on foreign investments and to attract major Chinese investors the government of Turkmenistan agreed to PSA format of agreements. During the visit of the President of Turkmenistan Gurbanguly Berdimukhamedov to the People's Republic of China on July 17, 2007, PSA agreement on development of Bagtiyarlik on the Amu Darya river territory was signed between parties. China is obliged to develop the field and build infrastructure and gas processing plants. This was an important precondition of the strategy to build the Turkmenistan–China gas pipeline two years later.¹⁴⁵

Turkmenistan: Neutrality and Integration into the Global Energy System

Neutrality has always been an important part of Turkmenistan's foreign policy. During the Summit of the Organization for Security and Cooperation in Europe in July 1992 Turkmen representatives declared "positive neutrality" as one of its foreign policy pillars. General Assembly of the United Nations, for the first time in the history of International Relations, adopted special resolutions on "Turkmenistan's Permanent Neutrality" on December 12, 1995. Twenty years passed, but neutrality remains the priority in its regional and global foreign policy as indicated in the "Foreign policy concept of Turkmenistan for the period of 2013–2020".¹⁴⁶

Turkmenistan's domestic energy policy is almost completely linked with its international energy interests. Its total primary energy production and consumption levels show that,

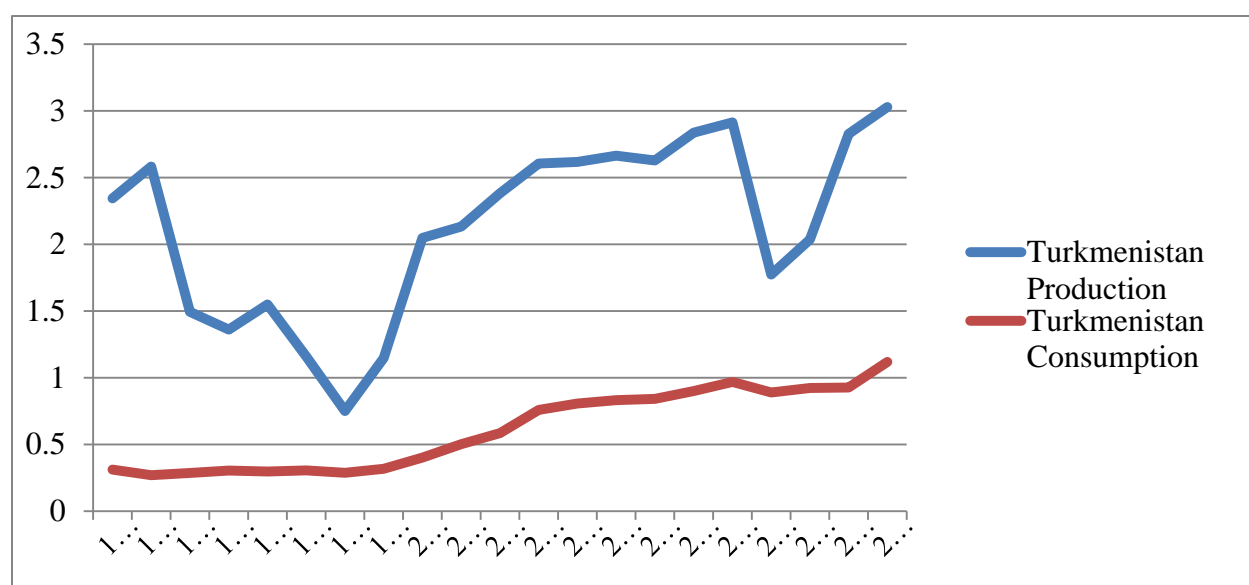
¹⁴⁴ Gawdat Bahgat, "The Geopolitics of Energy in Central Asia and the Caucasus," *The Journal of Social, Political, and Economic Studies* 34, no. 2 (2009): 143.

¹⁴⁵ State Agency for Management and Use of Hydrocarbon Resources under the President of Turkmenistan, *Ministry of Oil and Gas Industry and Mineral Resources Journal*, accessed September 15, 2014, <http://www.oilgas.gov.tm/minagenstvo.html>.

¹⁴⁶ "Neytralitet Turkmenistana: Politika Mira, Dobrososedstva i Razvitiya (Neutrality of Turkmenistan: Politics of Peace, Good Neighbourhood and Development)," *Ministry of Oil and Gas Industry and Mineral Resources Journal*, n.d., accessed March 20, 2015, <http://www.oilgas.gov.tm/neftgazovyj-sektor/item/316>.

Turkmenistan has sufficient production capacity to meet its energy needs. Natural gas constitutes the main source in the primary energy mix of Turkmenistan. However, the largest share of its gas production has been exported. After the collapse of the Soviet Union, lack of investment in maintaining the Turkmen gas sector and lower demand for gas all over the former Soviet space meant the level of primary energy production decreased up until the end of the 1990s.¹⁴⁷

Figure 5: Primary Energy Production and Consumption (quadrillion BTU) of Turkmenistan¹⁴⁸



Increasing demand for natural gas in Europe prompted Russia to use its transit leverage to gain economic revenues from re-exporting Turkmen gas and to boost gas production in the country again. A second sudden drop in gas production was instigated by Russia's inability to re-sell Central Asian gas to European markets due to the Russia–Ukraine gas crisis. While the gas crisis caused a temporary disruption, the 2008–2009 financial crisis had a longer-lasting effect on

¹⁴⁷ Institute of Strategic Studies and Analysis, *Central Asia. Geopolitics*, 50.

¹⁴⁸ US EIA, *International Energy Statistics—Turkmenistan*, (Washington, DC: US EIA, n.d), accessed January 5, 2015, <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=44&pid=44&aid=1&cid=TX,&syid=2008&eyid=2012&unit=QBTU>.

the gas supply cuts. Construction of a pipeline connecting Turkmen gas with the Chinese market instigated the second major gas production increase in the country. These ups and downs indicate that the gas production rate has always been dictated by external demand for Turkmen gas and not necessarily by the desire of the government to improve the country's energy security by connecting remote areas of Turkmenistan to the central pipeline networks.

Table 18: Turkmenistan—Major Export Items (in US\$ million and as Percentage of Total Exports)¹⁴⁹

	Natural gas		Oil products		Crude oil		Electricity	
	US\$m	%	US\$m	%	US\$m	%	US\$m	%
1996	1022.0	60.8	173.0	10.3	N/A	N/A	58.0	3.4
2000	1825.0	47.2	966.0	24.7	262.0	6.8	29.0	0.8
2005	5509.0	59.1	1661.0	17.8	1400.0	15.0	72.0	0.8
2008	274.0	36.4	221.0	3.6	N/A	N/A	39.0	5.2
2009	70.0	11.7	214.0	36.0	N/A	N/A	32.0	5.3
2010	389.0	32.8	211.0	17.7	142.0	11.9	10.0	0.8
2011	1244.0	49.7	513.0	20.5	242.0	9.7	16.0	0.7

Integration into the Global Energy System

With one of the richest natural gas reserves in the world, the government of Turkmenistan prioritizes integration into the global energy system and for the moment refrains from active cooperation with other Central Asian states.¹⁵⁰ “Oil and Gas Industry Development Programme of Turkmenistan for the period till 2030” is an important document in determining the country's energy security strategy.¹⁵¹ Almost complete dependence on Russian pipelines to move gas out of the country had negative consequences for Turkmenistan, and the country wants to diversify export routes in all possible directions (China, South Asia, and Europe) with long-

¹⁴⁹ Central Asia Data Gathering and Analysis Team, “Trade Policies and Major Export Items,” 11.

¹⁵⁰ Government of the Republic of Turkmenistan, *Towards New Paradigm of Global Energy Space* (Ashgabat: State News Agency of Turkmenistan, 2011), accessed June 5, 2014, http://turkmenistan.gov.tm/_eng/?id=105.

¹⁵¹ “An Enlarged Session of the Cabinet of Minister of Turkmenistan,” *State News Agency of Turkmenistan*, July 7, 2014, accessed December 5, 2014, <http://tdh.gov.tm/en/politics/news/10466-2014-07-07-23-14-51>.

term commitments, including swap deals. The government of Turkmenistan is currently referring to the “World Energy Outlook 2014” and the “Global Vision for Gas” forecast, which shows significant and continues increase of natural gas demand and Turkmenistan’s potential to play even bigger role in supplying this particular type of energy source. It is expected that gas consumption in China and India will amount to 603 billion m³ and 202 billion m³, respectively, by 2040. And Turkmenistan would be able to increase its gas production up to 230 billion m³, by 2040, to partially meet this growing demand.¹⁵² By highlighting the above-mentioned figures, the government of Turkmenistan is trying to emphasize its contribution to the global energy security, which was possible due to its neutral status, vast gas reserves and geographical location on the crossroads of Europe and Asia.¹⁵³ While the government prioritizes integration into the global energy system in its foreign energy policy, which basically implies connecting its oil and gas reserves with external energy markets, so far it has only succeeded in swapping Russian patronage for Chinese.

Having realized the possible consequences of such dependence, Turkmen government has been claiming the desire to establish gas export corridors toward European and South Asian directions. Current Turkmen elites show particular interest in the construction of the TAPI pipeline with the capacity of 33 billion m³. Turkmengaz, Afghan gas corporation, Pakistani Inter State Gas systems (Private) Limited and GAIL (India) Limited form the operating team of the TAPI Ltd. Project participants have already signed purchase agreements and determined sources, including Galkynysh giant gas field, to provide gas supplies. With the support of the

¹⁵² “Posledovatel’nyy Rost Znachimosti Turkmenistana na Mejdunarodnom Gazovom Rinke (Increasing Role of Turkmenistan in the International Gas Market),” *Ministry of Oil and Gas Industry and Mineral Resources Journal*, April 28, 2015, accessed May 5, 2015, <http://www.oilgas.gov.tm/neftegazovyj-sektor/item/402>.

¹⁵³ “Osnovnie Napravleniya Razvitiya Energeticheskoy Diplomatii Turkmenistana na Sovremennom Etape (Turkmenistan’s Energy Diplomacy: Its Main Development Directions in the Contemporary World),” *Ministry of Oil and Gas Industry and Mineral Resources Journal*, January 21, 2015, accessed March 4, 2015, <http://www.oilgas.gov.tm/neftegazovyj-sektor/item/59>.

ADB, project participants expressed willingness to start the construction of the pipeline as soon as possible, even in 2015.¹⁵⁴ Among various planned projects to export Central Asian natural resources, the Turkmenistan–Afghanistan–Pakistan–India (TAPI) pipeline—1,099-miles [1,820 km] long, with a capacity of 33 billion m³ of natural gas per year from the Dauletabad field in Turkmenistan—is considered the most challenging. While geography creates various challenges for the TAPI pipeline, it is not so much physical as commercial and political/security obstacles that are causing the delay in project realization. After the construction of the Baku–Tbilisi–Ceyhan pipeline (an extremely difficult project from an engineering point of view),¹⁵⁵ the chances of building the TAPI pipeline significantly increased. However, the region’s vulnerability to such security threats as terrorism and conflict, and doubts concerning the consuming countries’ capability to compete with Chinese and European prices for Central Asian energy have significantly slowed the project down. As a result, no significant progress has been made so far in terms of physical construction of the pipeline.

The Deputy Minister of Oil and Gas Industry and Mineral Resources, Kurganguly Yaziv, highlighted gas export diversification routes currently prioritized by the government:

- Turkmenistan–China: 65 billion m³;
- Turkmenistan–Russia: 10 billion m³, but the existing pipeline capacities allow exporting way more [up to 45 billion m³];
- Turkmenistan–Iran: 20 billion m³;
- TAPI: 33 billion m³;

¹⁵⁴ “Global Energy Security is a Guarantor of Sustainable Development,” *Ministry of Oil and Gas Industry*.

¹⁵⁵ The BTC was labelled “the first great engineering project of the twenty-first century.” There were doubts that the construction of the BTC is feasible, because this 1,099-mile[1,820 km]-long pipeline had to cross a number of difficult areas (1,500 rivers and water courses, high mountains and several major earthquake fault zones) while meeting environmental and social impact standards (Yergin, *The Quest*, 62).

- Turkmenistan–Europe: 30 billion m³ through the Trans–Caspian Gas pipeline.¹⁵⁶

With the current level of gas export capacity it will be quite challenging for Turkmenistan to supply gas in all directions. While export of Turkmen gas is increasing (it exported 45 billion m³ out of which 35 billion m³ went to China in 2014), gas supply in other directions is significantly dropping. Turkmenistan exported nearly 40 billion m³ to Russia in 2008 and only 10 billion m³ in 2013. Lack of gas transporting infrastructure, along with political and security issues, prevent Turkmen government from exporting gas in the European and South Asian directions.¹⁵⁷

Implementing Major Energy Projects

To meet external gas demand, Turkmenistan has to develop the giant gas field Galkynysh¹⁵⁸ (in the east) and connect it to some major gas pipelines located in the western parts of the country via the “East–West” trans–Turkmen gas pipeline.¹⁵⁹ Only by developing this field and increase extraction of gas in other fields Turkmenistan will be able to fulfill its obligations to external customers, but it is happening very slowly. As planned in the first stage of the development of this field, several gas-extracting facilities were completed allowing the development of 30 billion m³. During the second stage gas production capacity is targeting to reach 60 billion m³. Gas field, which began production in 2013 is expected to add 20 billion m³ annually by 2020.¹⁶⁰ It is expected to increase the volume of gas production up to 83,8 billion m³

¹⁵⁶ Kurganguly Yaziev, “Potential for the Gas Export of Turkmenistan.”

¹⁵⁷ “Turkmenistan Boosting Gas Exports to China,” *Energy Global*, February 11, 2015, accessed April 15, 2015, <http://www.energyglobal.com/downstream/gas-processing/11022015/Turkmenistan-boosting-gas-exports-to-China-230/>.

¹⁵⁸ “President of Turkmenistan Gurbanguly Berdimukhamedov Initiated a Start-up to the Second-phase Development of the Supergiant Deposit ‘Galkynysh’,” *State News Agency of Turkmenistan*, May 8, 2014, accessed December 5, 2014, <http://tdh.gov.tm/en/politics/news/10010-2014-05-08-03-52-22>.

¹⁵⁹ A. Chernayev, *High Paces to Scale Construction* (Ashgabat: Government of the Republic of Turkmenistan, 2012), accessed March 10, 2014, http://turkmenistan.gov.tm/_eng/?id=1129.

¹⁶⁰ “Turkmenistan Boosting Gas Exports to China,” *Energy Global*.

and export 48 billion m³ of it in 2015.¹⁶¹ If the government gets close to this number, it will be possible due to the development of this giant gas field.

Given that Turkmenistan is the least-connected country in the region, and is not dependent on other Central Asian countries' energy resources, it is not surprising that the Turkmen government decided to isolate itself from tensions over the shared management of water and energy resources in the region.¹⁶² Without doubt the importance of revenues, generated from selling gas to external markets, for the development of Turkmen energy sector, should not be underestimated. Exporting gas to external customers does not directly contribute to the energy security of the country; however, the export of gas to neighbouring Uzbekistan in case of emergency and potentially to Tajikistan and Kyrgyzstan via the CAGP Line-D or swap gas deals through Uzbekistan and in exchange receiving (cheaper and environmentally cleaner) electricity from upstream Central Asian countries does. Arranging delivery of Turkmen gas to Kyrgyzstan and Tajikistan via swap arrangements with Uzbekistan and supply of upstream countries' electricity to Turkmenistan again through swap agreements with Uzbekistan have the potential to contribute to the level of energy security in the region. The fact that Turkmen and Uzbek gas is currently transported to China through Kazakh territory only adds strategic importance to the Line-D pipeline, from the Chinese perspective that feels uncomfortable of complete dependence on solely Kazakhstan's pipeline infrastructure. Line-D with a capacity of 30 billion m³ per year, which is designed to move natural gas avoiding Kazakhstan, and thus, has a very high chance of realization. However, the conflict between Uzbekistan and upstream

¹⁶¹ "Energeticheskaya Politika Turkmenistana: Diversifikaciya Eksporta Gaza (Energy Policy of Turkmenistan: Gas Export Diversification)," *Ministry of Oil and Gas Industry and Mineral Resources Journal*, access date May 25, 2015, <http://www.oilgas.gov.tm/publikatsii/item/416>.

¹⁶² Rustam Berdiev, Procurement/Asset Management Assistant, Organization for Security and Co-operation in Europe, Center in Ashgabat, Turkmenistan, September 7, 2013.

countries may negatively affect any sort of swap arrangements to move and transit gas within Central Asia.

Energy Sector of Uzbekistan

Uzbekistan is a major fossil fuels producer in Central Asia. Uzbekneftgaz, a state-owned oil and gas company, estimates 60 percent of Uzbekistan's territory has a potential for oil and gas extraction. Two hundred and eleven hydrocarbon fields had been discovered in the country: 108 gas and gas condensate, 103 oil and gas, oil condensate and oil. Over 50 percent of them are being exploited, while 35 percent are under development. Currently, oil and gas production accounts for 86 million tonnes of oil equivalent, which increased by 60 percent comparing to 1991. Uzbekistan has the capacity to not only extract, but also refine most of the oil and gas produced. Fergana oil refinery was put into operation back in 1958. Another oil refinery was built in Bukhara in 1997.¹⁶³ The gas refinery complex of Uzbekistan consists of Mubarek and Shurtan complexes. Mubarek has the annual gas processing capacity of 30 billion m³ and Shurtan around 20 billion m³.¹⁶⁴

In 2013, Uzbekistan celebrated the 60th anniversary of its gas industry. The country possesses around 1.1 trillion m³ of gas.¹⁶⁵ The largest gas field in the country, Gazly (Bukhara region), has the capacity to provide 500 billion m³ of gas. Most of the gas production (around 45–50 billion m³ per year out of annual 60–70 billion m³) comes from the Bukhara–Khiva region from such fields as Gazli, Shurtan, Kultak, Alan, Zevardy, Umid, South Kemachi, Kruk and

¹⁶³ Uzbekneftegaz, *Osnovnie Pokazateli (Key Indicators)* (Tashkent: Ung.uz, 2014), accessed June 1, 2014, <http://www.ung.uz/ru/business/indicators>.

¹⁶⁴ Uzinfoinvest, "Oil and Gas Sector," (n.d), accessed May 10, 2015.

http://www.uzinfoinvest.uz/eng/investment_opportunities/by_industry/oil_and_gas_sector/.

¹⁶⁵ British Petroleum Company, *BP Statistical Review*.

Urtabulak.¹⁶⁶ Gas to the Bukhara, Samarkand and Tashkent regions through the Dzharkak–Tashkent gas pipeline is supplied from this field. Gas from Gazly is transported to Ural through a pipeline that is 2000 km long.¹⁶⁷ This gas field also fills the Uzbek section of the CAGP. The State Investment Program of the Republic of Uzbekistan for 2013 aimed to attract foreign investments in a number of branches of industry, including oil and gas (58.9 percent) and electricity generation (5 percent).¹⁶⁸

Currently, 87 percent of consumed electricity is produced in gas- and coal-fired TPPs. Uzbekistan possesses explored coal reserves with a volume of 1900 million tonnes, which are being extracted mainly in Angren, Shargun, and Baysun fields.¹⁶⁹ The Government of Uzbekistan, at least officially, acknowledges that the “brown economy” model slows down the transition to a long-term sustainable electric power sector. The sustainability of electricity supplies can be achieved through the development of a green economy and government officials often claim that Uzbekistan is steadily moving in this direction. Solar energy research and development in Uzbekistan started in the 1980s, but little progress is achieved so far. Currently RES is highly underdeveloped since its share does not exceed 2 percent (excluding hydro power) of the overall electricity production. In the 1960s, more than 250 small and mini HPPs were functioning in Uzbekistan. Even though the number of small HPPs is decreasing, Uzbekistan is willing to support small HPPs, because they are considered environmentally less damaging, capable of supplying electricity to remote areas, and require less capital and investment, which

¹⁶⁶ Simon Pirani, “Central Asian and Caspian Gas Production,” 35.

¹⁶⁷ Uzbekneftegaz, *Perviy Gaz Uzbekistana (Uzbekistan’s First Gas)* (Tashkent: Uzbekneftegaz, 2013), accessed June 1, 2014, http://www.ung.uz/press_center/smi/pervyj_gaz_uzbekistana/.

¹⁶⁸ Ministry of Foreign Economic Relations, Investments and Trade of the Republic of Uzbekistan, *Statistics* (Tashkent: Mfer.uz, n.d), accessed September 10, 2014, <http://www.mfer.uz/en/news/statistics/>.

¹⁶⁹ Government of the Republic of Uzbekistan, *Coal Industry* (Tashkent: Governmental Portal of the Republic of Uzbekistan, n.d), accessed June 5, 2014, <http://www.gov.uz/en/helpinfo/energy/2680>.

can shortly be returned.¹⁷⁰ Uzbekistan does not prioritize hydro power like it prioritizes gas or oil. However, hydro power is still important for the Uzbek energy sector development, since it accounts for 20 percent of the overall electricity production and is considered to be the main source of clean electricity production in the country.¹⁷¹

Uzbekistan: Prioritizing Stability in Energy Policy

Uzbek authorities believe that Uzbekistan is among the few countries in the world that have sufficient energy supplies to meet their energy demands. Guided, in part, by the belief of self-sufficiency, Uzbekistan withdrew from the CAPS and signed a number of agreements on exporting natural gas to external markets. To keep prices affordable, the government of Uzbekistan is subsidizing its energy sector. The sustainability of the Uzbek energy sector is another area that authorities often highlight in their speeches. The evidence, however, shows that Uzbekistan neither enjoys energy security, nor is capable of continuing to subsidize its energy sector without negatively affecting its economy.

Energy Production Capacity

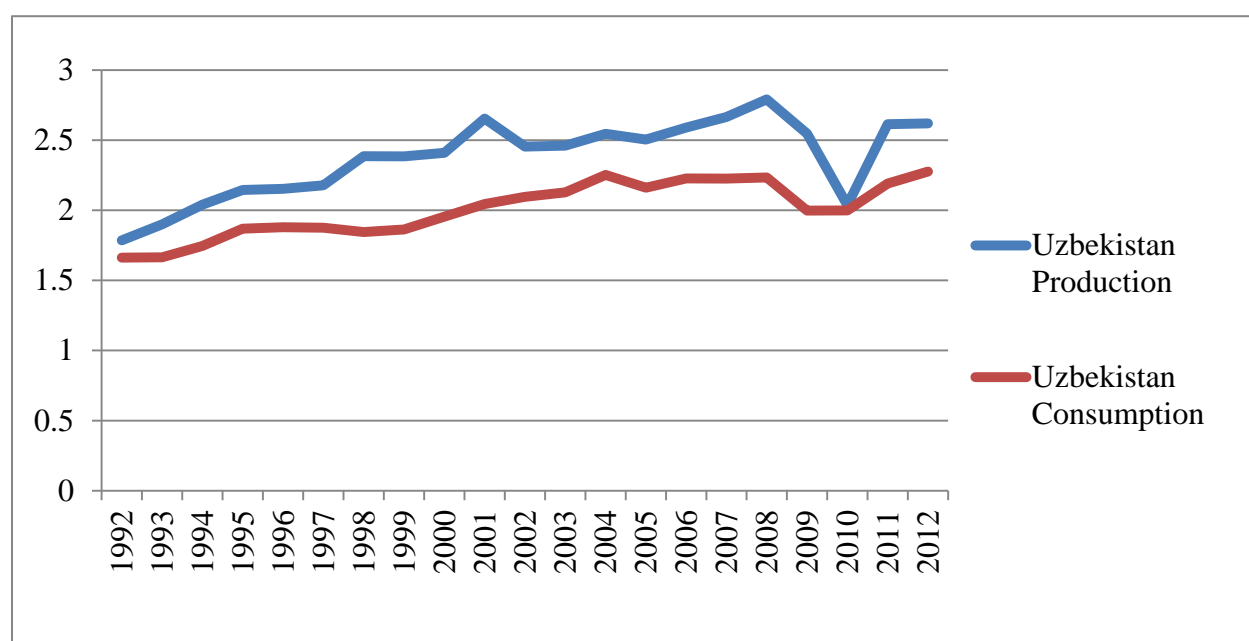
Total primary energy production matches the consumption level in Uzbekistan. Natural gas constitutes the major part of primary energy production. With the capacity of over 60 billion m³ per year, it is one of the major producers of gas in the region. However, Uzbekistan consumes most of its produced gas. Gas consumption represented approximately 85 percent of the primary energy consumption level in 2013; with oil products and coal representing 7 percent and 3 percent, respectively. Hydroelectricity accounted for the remaining 5 percent of the share in

¹⁷⁰ V. V. Alixanov, “Konceptualnie Podxodi k Formirovaniyu Green Economy v Uzbekistan (Conceptual Approaches to Green Economy in Uzbekistan),” *Center for Economic Research, Analytical report*, 2011, 64.

¹⁷¹ World Bank, *Electricity Production from Hydroelectric Sources (percent of total), for 2011* (Washington, DC: World Bank), <http://data.worldbank.org/indicator/EG.ELC.HYRO.ZS>.

2013.¹⁷² Installed capacity of all electric power plants in Uzbekistan exceeds 12.3 GW, with TPPs contributing more than 11 GW and HPP around 1.3 GW, which equals 50 percent of all generating capacities of the interconnected CAPS.¹⁷³ The largest share of thermal electricity production comes to the gas-fired TPPs. So Uzbekistan consumes almost as much gas as it produces, which means that any initiative to increase gas export to external customers will come at the expense of domestic consumption.

Figure 6: Primary Energy Production and Consumption (quadrillion BTU) of Uzbekistan¹⁷⁴



Energy Insecurity

Most of the gas produced in Uzbekistan is consumed domestically. Uzbekneftgaz, a state owned gas company, supplied 48.8 billion m³ of gas out of produced 57.3 billion m³ to domestic

¹⁷² US EIA, *Uzbekistan—Overview/Data* (Washington, DC: US EIA, n.d), accessed January 7, 2015, <http://www.eia.gov/beta/international/country.cfm?iso=UZB>.

¹⁷³ Government of the Republic of Uzbekistan, *Energy Resources of Uzbekistan* (Tashkent: Governmental Portal of the Republic of Uzbekistan, n.d), accessed July 1, 2014, <http://www.gov.uz/en/helpinfo/energy/10004>.

¹⁷⁴ US EIA, *International Energy Statistics—Uzbekistan* (Washington, DC: US EIA, n.d), accessed January 7, 2015, <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=44&pid=44&aid=2&cid=UZ,&syid=1992&eyid=2012&unit=QBTU>.

consumers in 2014.¹⁷⁵ The population of around 30 million people (almost equal to other Central Asian countries' population combined) is a factor that can explain the higher rate of energy consumption compared to other Central Asian states. Most importantly, however, highly inefficient energy production, transportation and consumption facilities account for 60 percent of primary energy loss and affect the consumption level.¹⁷⁶ Due to its considerable gas production capacity Uzbekistan avoids severe and prolonged gas crises. Uzbekistan's electric power generation capacities saved it from experiencing serious electricity supply shortage even when it left the CAPS. However, it is not an issue of survival, but rather the question of sufficient gas and electricity supplies to meet economic and population needs for the foreseeable future that constitutes the core of energy security of the country. Electricity blackouts and gas supply shortages, especially for the population needs, are indicators of energy security challenges that Uzbekistan has to deal with.

T. P. Salikhov from the Institute of Power Engineering and Automation in Tashkent argued that Uzbekistan achieved self-sufficiency in fuel in 1995 and became fully self-sufficient in energy resources in 1996–1997.¹⁷⁷ However, despite that claim, energy security challenges that Uzbekistan is currently facing prove the fact that the operation of its energy system in isolation mode has its cost. As a first stage of energy strategy, Uzbekistan aimed to achieve: energy independence; natural gas supplies accessible to the entire population; and low energy prices.¹⁷⁸ Uzbekistan has perhaps achieved these goals, as it no longer imports energy, there is a countrywide gas pipeline and electricity transmission lines and energy prices are relatively low.

¹⁷⁵ British Petroleum Company, *BP Statistical Review*.

¹⁷⁶ World Bank, "Uzbekistan: The Economics of Efficiency. Uzbekistan Pushes to Reduce Energy Consumption in Industry," (Washington, DC: World Bank), April 30, 2013, accessed May 1, 2014, <http://www.worldbank.org/en/results/2013/04/30/uzbekistan-the-economics-of-efficiency>.

¹⁷⁷ T. P. Salikhov, "Stages and Results of Energy Strategy Realization in Uzbekistan," *Journal of Economic Review*, October 2004, 49.

¹⁷⁸ *Ibid.*, 48.

Uzbek authorities, however, failed to sustain sufficient energy supplies and the subsidized energy market cost the budget billions of dollars.

Securing Affordable Gas Prices

The energy sector of Uzbekistan is highly subsidized. Due to its share in the overall energy consumption, gas sector has the greatest affect on the Uzbek economy. Uzbek household consumers paid US\$50 per 1,000 m³ of gas in 2013.¹⁷⁹ For the comparison, Uzbekistan exported gas for the last several years at around the price of US\$300 per 1,000 m³. The government subsidizes almost US\$10 billion annually in the country's gas sector alone each year.¹⁸⁰ Due to financial difficulties, however, Uzbekistan cannot afford to continue subsidizing the gas sector and keeping prices low without negatively affecting the economy. Since private gas companies refrain from engaging in the distribution and sale of gas in the domestic market, which is the highly subsidized Uzbek energy sectors, the state-owned energy provider Uzbekenergo, fully controlled by the government, is responsible for ensuring the affordability of gas.

Ensuring Sustainability and Efficiency of the Energy Sector

There is a lack of transparency in the energy sector, and it is difficult to provide statistical data proving deficiency of energy in the country. However, numerous complaints by the population and periodic electricity blackouts and gas supply shortages in the country indicate that there are serious energy security challenges that require attention by the Uzbek authorities.

First, Uzbekistan consumes too much environmentally unfriendly energy sources. 85 percent of total coal produced in the country is used to generate electricity.¹⁸¹ Second, the energy intensity (energy efficiency measurement) of Uzbekistan exceeds other middle-level developing

¹⁷⁹ Head of Sales Department of "Buxorogaz," Personal Interview, Bukhara, Uzbekistan, June 23, 2013.

¹⁸⁰ International Energy Agency, *Fossil Fuel Consumption Subsidy Rates*.

¹⁸¹ Government of the Republic of Uzbekistan, *Coal Industry*.

countries by 2–2.5 times.¹⁸² Thus, increasing the energy efficiency of outdated energy producing and transporting facilities requires urgent government attention. Most importantly, however, to have an immediate affect on sustainability of the Uzbek energy sector, existing resources have to be used in the most rational way. In the winter, burning gas and coal produces thermal electricity and is used for heating purposes, while in summer TPPs only generate electricity. Within the CAPS, Tajikistan and Kyrgyzstan supplied clean electricity to downstream Uzbekistan during vegetation (spring–summer) period. In return, Uzbekistan exported electricity produced in gas-fired TPPs to upstream neighbours in the wintertime and provided heating services to its population. The majority of Uzbekistan’s population receive heating services through the central heating system run by the coal- and gas-fired (combined heat and power plants) TPPs. Withdrawal from the CAPS forced Uzbekistan to increase thermal electricity production in summer months, with no need for heat generation. Coordinated operation of the electric power systems, also contributed to Uzbekistan’s ability to fully meet its electricity demand peaks in the morning and evening.¹⁸³

Nonetheless, Uzbekistan decided to withdraw from the CAPS. Some experts characterize the decision as a politically motivated move.¹⁸⁴ Others argue that Uzbekistan’s withdrawal was provoked by Tajikistan itself. Announcement of the opening of a new 500 kV electric power transmission line South–North by Tajik authorities without proper notification of their counterparts was considered by the Uzbek side as Tajikistan’s attempt to establish independent

¹⁸² Alixanov, “Conceptual Approaches to Green Economy in Uzbekistan,” 64.

¹⁸³ Gulnura Toralieva, “Destruction of Central Asian Electricity Grid: Causes and Implications,” *EUCAM*, No. 8, January 2010.

¹⁸⁴ “Uzbekistan Withdraws from the Central Asian Power Grid,” *BBC News*, December 1, 2009, accessed March 5, 2015, <http://news.bbc.co.uk/2/hi/asia-pacific/8388406.stm>.

electric power system and a preparation to withdraw from the CAPS.¹⁸⁵ Perhaps referring to this particular announcement, Sagdulaev, head of the Uzbekenergo, published an article in the Pravda Vostoka newspaper saying that, “[from now on (2009)] Central Asian electric power grid operations will jeopardize stability and safe functioning of Uzbek electric power system, and Uzbekistan raises the issue of withdrawing from the system and operating in a separate mode.” The message that he tried to deliver was that every Central Asian state was pursuing its own interests with no concerns for the consequences to others. And that exactly what Uzbekistan did.¹⁸⁶ In any case, Uzbekistan’s withdrawal from the CAPS to a different extent affected all its member states.

Increasing Gas Export Capacity

Uzbekistan had been annually supplying approximately 10–15 billion m³ of gas to Russia¹⁸⁷ and 4.5 billion m³ within the Central Asian region.¹⁸⁸ The leaders of Uzbekistan and China also agreed to reach the total volume of gas supply of 25 billion m³ by 2016¹⁸⁹ and maintain the annual export volume of 10 billion m³ through the Line–C of the CAGP. However, outdated and inefficient natural gas transportation systems, growing internal energy demand, and

¹⁸⁵ Payrav Chroshabiyev, “Uzbekistan’s Decision to Withdraw from CA Power Grid Provoked by Tajikistan Itself, Says Tajik Expert,” *ASIA-Plus*, November 9, 2009, accessed May 1, 2015, <http://news.tj/en/news/uzbekistan-s-decision-withdraw-ca-power-grid-provoked-tajikistan-itself-says-tajik-expert>.

¹⁸⁶ Avaz Yuldoshev and Victoria Naumova, “Uzbekistan Plans to Pull out of Central Asia’s Power Grid Next Month,” *ASIA-Plus*, November 7, 2009, accessed March 20, 2015, <http://www.news.tj/en/news/uzbekistan-plans-pull-out-central-asia-s-power-grid-next-month>.

¹⁸⁷ Farkhad Sharip, “Uzbekistan’s Quest for Aral Sea Oil May Weaken Kazakhstan’s Position in the Caspian,” *Eurasia Daily Monitor* 9, no. 23 (2012), accessed June 1, 2014, http://www.jamestown.org/single/?no_cache=1&tx_ttnews%5Btt_news%5D=38962.

¹⁸⁸ US EIA, *Kazakhstan—Analysis* (Washington, DC: US EIA, n.d), accessed March 20, 2014, <http://www.eia.gov/countries/cab.cfm?fips=KZ>.

¹⁸⁹ “Uzbekistan i Kitai: Vzaimovigodnoe Sotrudnichestvo (Uzbekistan and China: Mutually Beneficial Cooperation),” June 6, 2012, accessed May 5, 2014, http://russian.china.org.cn/exclusive/txt/2012-06/06/content_25591078.htm.

the fact that no major natural gas reserves have recently been developed are indications of Uzbekistan's physical incapability to increase its gas export capacity.

Lack of Energy Sector Accountability and Transparency

The above analysis highlights particular areas of activity that Central Asian governments prioritize in their national energy policies. With the exception of Kyrgyzstan, which has recently undergone a regime change, Central Asian elites have remained in power for decades, and it is not surprising that they refrain from elevating the problem of lack of accountability as well as corruption in the energy sector and rent-seeking to the policy priority level. Central Asian energy policies as they stand right now can be characterized as short-term oriented, state centric, and hydrocarbons/hydro power focused. This implies that the Central Asian elites, having retained control over energy production and transportation industries, try to take maximum benefits out of them while remaining in power. The Central Asian elites and their political clients collect rents and extract private benefits from mismanaging the energy sector. The problem of energy sector accountability and transparency affects equal distribution of oil/gas funds, prioritizing energy security concerns of the population and economies of the Central Asian countries as well as the development of non-conventional energy sectors from which elites cannot extract immediate benefits.

There are, in fact, many examples of rent-seeking that plague the Central Asian energy sectors, including: the “Kazakhgate” scandal over the secret account in a Swiss bank on payment made for oil contract;¹⁹⁰ Bakiyev’s energy sector reform as a result of which the electric power sector of Kyrgyzstan was partially privatized and exported, pocketed by the ruling regime even

¹⁹⁰ “Kazakhstan – an End to ‘Kazakhgate’,” *OSW Center for Eastern Studies*, August 18, 2010, accessed April 15, 2015, <http://www.osw.waw.pl/en/publikacje/analyses/2010-08-18/kazakhstan-end-to-kazakhgate>.

at the expense of creating serious domestic blackouts;¹⁹¹ nationwide obligatory collection of money to build the Rogun dam in Tajikistan with insignificant final result;¹⁹² the scandal around the Zeromax conglomerate in Uzbekistan for the control of resources by the government against certain elite groups;¹⁹³ and the problem of lack of transparency in regards to the “stabilization fund” of Turkmenistan.¹⁹⁴

Even though there are many signs indicating that short-term sufficiency of resources and long-term sustainability of energy supplies are highly dependent on reforming the energy governing system, Central Asian elites profit from the current energy sector management schemes established in their respective countries and thus, refrain from raising the issue of energy sector accountability and transparency to the state policy level. Without doubt elites benefit from natural endowment rents and perhaps only care about maximizing short-term profits. Since the subsidized domestic energy markets are rather burdens for the Central Asian governments than a source of income, it is not surprising that they are actively looking for the possibilities to earn hard currency by increasing energy exports to as many external markets as possible. Intra-Central Asian energy trade, which can contribute to the sufficiency and sustainability of energy supplies, however, does not conflict with either availability of energy for domestic consumption or to meet external demand. First, the volume of energy traded within the Central Asian region is insignificant compared to the level of domestic consumption and external demand. So the intra-regional energy trade does not affect revenues from selling energy to external customers or availability of energy for local consumers. Second, intra-Central Asian gas

¹⁹¹ Erica Marat, “Criminalization of the Kyrgyz State Before and After the Tulip Revolution,” *China and Eurasia Forum Quarterly*, Vol. 6, No. 2, (2008), 18.

¹⁹² International Crisis Group, *Central Asia: Decay and Decline* (Asia Report 201, 2011), 14.

¹⁹³ Simon Pirani, “Central Asian and Caspian Gas Production and the Constraints on Export,” *Oxford Institute for Energy Studies*, 2012, 33, accessed May 1, 2014, http://www.oxfordenergy.org/wpcms/wp-content/uploads/2012/12/NG_69.pdf.

¹⁹⁴ International Institute for Political, “Investment Opportunities in Turkmenistan: Political Risks Analysis,” 2011, 19, accessed April 1, 2015, http://www.minchenko.ru/netcat_files/File/Print_eng_Preview.pdf.

and electricity trade is no longer subsidized and may be considered as a source of income for the regional producers. Initiatives to establish economic regionalism, argues Kathleen Collins, fail because it implies liberalization of Central Asian countries' economies, which can directly affect personalities rule and patronage systems, and Central Asian leaders try to block such initiatives.¹⁹⁵ Energy trade within the region, however, does not necessarily imply liberalization of the Central Asian energy sectors, but the release of information required to ensure coordinated operation of gas pipeline networks and electric power grids. Thus, I tend to believe that the lack of energy trade within the CAES is not just a mindset problem of elites coupled with a series of internal governance problems, but also a coordination problem, which sometimes downplays domestic obstacles.

Governments' Position Toward Regional Energy Cooperation

The analysis of the Central Asian states' energy policy priorities illustrates that intra-Central Asian energy cooperation is no longer a priority. Uzbekistan considers itself capable of entirely meeting its electricity as well as gas/fuel needs. Within the framework of its National Development Programs, Uzbekistan prioritizes "stability"—a status quo in energy and water consumption.¹⁹⁶ Any project that brings major changes to the status quo is considered to be compromising stability and, thus, unacceptable. The Uzbek government's inflexible position regarding construction of the Rogun and Kambarata-1 is a clear example of its static energy/water policy. Despite the fact that the lack of intraregional energy cooperation is to some extent negatively affecting the energy security of Uzbekistan, it continues to avoid the resolution

¹⁹⁵ Kathleen Collins, "Economic and Security Regionalism among Patrimonial Authoritarian Regimes: The Case of Central Asia," *Europe-Asia Studies* (61), no. 2, (March 2009): 251.

¹⁹⁶ Government of the Republic of Uzbekistan, *Investments* (Tashkent: Governmental Portal of the Republic of Uzbekistan, n.d), accessed October 1, 2014, <http://www.gov.uz/en/business/invest/1175>.

of water-energy nexus problems in Central Asia, because the current water distribution, in which Uzbekistan enjoys over 50 percent of water withdrawal, the amount necessary to cultivate high quantities of water-intensive cotton and wheat, perfectly suits its interests.¹⁹⁷ Uzbekistan warns to use actions, including force, against any serious interference with the current level of water withdrawal in the region.¹⁹⁸ Geographical location and inherited energy infrastructure turned Uzbekistan into an extremely important actor, without which any initiative to improve Central Asian energy cooperation will most likely fail. Over the last years, however, Uzbekistan has been using its infrastructural as well as geographical advantage for purposes other than to improve the energy security of the country and the region as a whole.

There are still some prospects for the security of the CAES through increasing intra-Central Asian energy cooperation. Prolonged energy supply cuts forced Kyrgyzstan and Tajikistan to accelerate the process of establishing independent energy systems and, thus, decrease Uzbekistan's energy leverage over them.¹⁹⁹ So keeping a certain level of energy exchange serves Uzbekistan's strategic interests. Kazakhstan is also in the process of establishing independent energy system, but it can still benefit from exchanging energy resources with Kyrgyzstan and Uzbekistan as well as from its important gas transit status. More than 90 percent of Turkmen gas has to pass through the territory of the Central Asian countries; therefore, the stability and security of the region is in Turkmenistan's direct interest. Overall, cheap and clean electricity imported from upstream countries would allow Central Asian

¹⁹⁷ Jenniver Sehring, *The Politics of Water Institutional Reform in Neo-Patrimonial States: A Comparative Analysis of Kyrgyzstan and Tajikistan* (Springer Science & Business Media, 2009), 71.

¹⁹⁸ Fuel Energy Sector Transparency Initiative in Kyrgyz Republic, "Kambaratinskie Strasti (Kambarata passion)," *Energoforum*, December 10, 2012, accessed June 5, 2014, http://www.energoforum.kg/index.php?act=view_material&id=374.

¹⁹⁹ Farkhod Tolipov, Personal Interview, Director of Bylim Karvoni Non-governmental Research and Training Center, Tashkent, Uzbekistan, June 29, 2013.

downstream countries to efficiently use coal- and gas-fired TPP as well as contribute to the sustainability of their energy sectors.

Small HPPs and a countrywide electric power transmission network will not solve the problem of electricity shortages in wintertime in Tajikistan and Kyrgyzstan. Development of oil and gas fields in these countries is too costly due to difficulty of extraction and transportation of these resources. Unlike Kyrgyzstan, which may rely on Kazakhstan to ensure limited winter electricity supplies and Russia to import Uzbek gas, Tajikistan has no state actor in the region to entrust in assisting in energy crisis mitigation. President of Tajikistan, Imomali Rahmon, often highlights the Tajik position in regards to regional cooperation, arguing that “it [Tajikistan] will always adhere to the principles of friendship, mutual respect and trust, good will and beneficial and constructive collaboration.”²⁰⁰ In fact, leaders of the Central Asian states often talk about historical friendship, but such claims rarely result in regional projects especially in the strategically important energy sector. Tajikistan can clearly benefit from the intra-Central Asian cooperation in the energy sector, but the Tajik government does not possess the power to either force or encourage neighbouring Uzbekistan to reinstate gas and electricity trade and cooperation. Surplus of electricity generation in summer (3–5 billion kWh annually) and electricity shortage in winter (2.5 billion kWh annually) provides some prospects for mutually beneficial electricity trade in the region.²⁰¹ Unable to export extra produced electricity in summer to neighbouring Uzbekistan, Tajik authorities, with the support of some international actors such as the Asian Development Bank and the World Bank, wish to redirect this electricity to South Asian countries. However, the Central Asia–South Asia Regional Electricity Trade Project

²⁰⁰ President of the Republic of Tajikistan, *Annual address of the President of the Republic of Tajikistan Emomali Rahmon to the Majlisi Oli of the Republic of Tajikistan* (Dushanbe: President of the Republic of Tajikistan, 2014), accessed December 1, 2014, <http://www.prezident.tj/en/node/6600>.

²⁰¹ Ibid.

(CASA–1000), a project designed to move electricity from Central Asia to South Asia, will not solve the energy security problems of the Central Asian upstream states because it is designed to move electricity out of the region. The following chapter identifies the main challenges preventing Central Asian states from engaging in a greater level of energy sector cooperation to ensure security of the CAES.

CHAPTER III. Security of the Central Asian Energy (Gas and Electric Power) System

Central Asia is one of the regions in the world that enjoys an abundance of energy resources. There is also a demand for Central Asian energy both within the region and by external customers such as Russia, China, Europe and potentially India. Due to relatively limited production capacity, inefficient energy sectors, and the necessity to meet domestic needs, Central Asian producers may experience difficulties to entirely meet growing demand by those customers. The temptation of revenues coming from exporting large quantities of energy to external markets and binding obligations to supply agreed amounts of resources force Central Asian producers to increase export capacity, even at the expense of domestic and intraregional energy consumption.

The resource-sharing mechanism ensured reliable and stable energy supplies during the Soviet era and right after the disintegration of the Soviet Union. The mechanism was quite simple: the upstream countries of Kyrgyzstan and Tajikistan ensured a continuous flow of water and a certain amount of electricity during the summer to the downstream countries, Kazakhstan, Turkmenistan, and Uzbekistan, which channelled thermal electricity, gas, and light oil products to them in return.¹ The CAES, which operated within the resource-sharing mechanism and ensured sufficiency of energy supplies simultaneously to all five countries, mainly consisted of the Central Asian gas pipeline system and the Central Asian electric power grids. With the collapse of the Soviet Union, the Soviet-era supranational energy sector management system also broke down into smaller units. Central Asian energy sectors, which were initially designed to function within its own unified system, continued to operate by inertia in coordination with each other by retaining high level of interdependence. However, the level of interdependence has been

¹ Murodbek Laldjebaev, "The Water–Energy Puzzle in Central Asia: The Tajikistan Perspective," *International Journal of Water Resources Development* 26, no. 1 (2010): 24, doi:10.1080/07900620903391812.

gradually decreasing since then. After the disintegration of the Soviet Union, introducing a pricing policy for the oil and gas trade while simultaneously sharing water resources and increasing and diversifying exports to external markets all put strains on the mechanism, particularly in a context of rising prices. The Almaty Agreement of 1992 was supposed to keep the mechanism functioning “until the states could reach a solution amenable to all parties.”² Fundamental disagreement between the region’s demand for water for irrigation and the use of water to generate electricity, along with disputes over the price for fossil fuels and many other factors have led to a conflict between upstream and downstream countries. While both coal and oil are important sources of energy for the Central Asian countries, this research is focused on gas pipeline networks and electric power grids that bind regional states and create an element of high interdependence. While oil sector is largely determined by the global market rules and coal is locally traded energy commodity in the region, it is the natural gas and electricity trade that mostly drive regional dynamics in the energy sector in Central Asia.

Central Asia is not the only region where non-cooperative dynamics between states in the energy sector impact the availability of sufficient and stable energy supplies. What distinguishes this region from the rest of the world, however, is the fact that, initially, Central Asian countries’ energy sectors were designed to operate within a unified energy system. Interdependence of energy sectors implies that energy security challenges, which go beyond the scope of one state, require coordinated actions to be taken by all parties involved. However, intra-Central Asian energy trade within the framework of the resource-sharing mechanism that ensured stability of energy supplies in the region is being compromised by producers’ desire to increase export capacity to external markets at the expense of intraregional consumption: trade between Central

² Ariel Dinar et al., *Bridges Over Water: Understanding Transboundary Water Conflict, Negotiation and Cooperation* (New Jersey: World Scientific, 2007), 294.

Asian oil and natural gas exporters and external energy importers (Russia, China, Iran, indirectly Europe, and potentially Afghanistan, Pakistan, and India); and hydro-power export from mainly Tajikistan, Uzbekistan, and possibly Kyrgyzstan to South Asia (Afghanistan and Pakistan), and potentially to China and India.

The security of the CAES, within which Central Asian states are highly dependent on intraregional gas pipeline networks and electric power grids, is complicated both by the region's landlocked status and the fact that Central Asia is surrounded by larger powers, such as China, Russia, India, and Europe, which often compete for the region's resources.³ These powers are currently avoiding major confrontation and relatively peacefully co-existing in Central Asia by largely pursuing distinct (non-competing) strategic interests (political influence for Russia, energy interest and stability in Xinjiang for China, partnership within a number of areas, including human security, good governance, etc. for Europe).⁴ However, perhaps to a different extent at the moment, they all are interested in Central Asian energy resources. And, it is not the consequences of competing interests of these powers for their own energy sectors, economies and geopolitical gains that this research is concerned about. It is rather the impact of bigger powers' competing energy interests on the availability of sufficient energy resources for domestic and intra-Central Asian consumption that is placed in the center of this particular research. And there are already signs that diversified energy markets, which significantly increase the demand for the region's resources, affect and will continue to threaten sufficiency of energy supplies for internal and intraregional needs.

³ Gawdat Bahgat, "Central Asia and Energy Security," *Asian Affairs* 38, no. 1 (2006): 3, doi:10.1080/03068370500456819.

⁴ Alexander Cooley, *Great Games, Local Rules: The New Great Power Contest in Central Asia* (New York: Oxford University Press, 2012).

The landlocked geographical location not only limits Central Asian states' access to global energy markets, but also makes pipeline networks the only economically efficient way to transport oil and gas from Central Asia. Building pipelines requires significant upfront investments that Central Asian producers, due to their limited financial capabilities, cannot afford to cover. The same applies to the construction of large HPPs and electricity transmission lines connecting Central Asian producers and external customers. Taking loans forces regional producers to agree upon the distribution of control over resources, which often does not serve their best interest. Due to asymmetrical interdependence among actors and strategic interest that states input in their energy export/import relations, energy has sometimes been used for purposes other than to ensure energy security, causing supply disruptions in Central Asia, especially when it is needed the most (during the winter period).

Security of the Central Asian Gas System

Possessing reserves of approximately 20 trillion m³ of natural gas,⁵ Central Asia is becoming increasingly attractive to energy-thirsty larger powers surrounding the region. While gas importers address the need to ensure steady imports of gas and the security of gas supplies, Central Asian exporters aim to secure their ability to constantly export it to obtain a steady income.

The Central Asian countries can roughly be divided into net consumers (Tajikistan and Kyrgyzstan) and net producers (Kazakhstan, Turkmenistan, and Uzbekistan). The CAES during the Soviet period was constructed in such a way that the stability and reliability of gas supplies were maintained through a resource-sharing mechanism. Although there is still a demand for gas

⁵ British Petroleum Company, *BP Statistical Review of World Energy June 2015* (London: British Petroleum Co., 2015), accessed June 25, 2015, <http://www.bp.com/content/dam/bp/pdf/Energy-economics/statistical-review-2015/bp-statistical-review-of-world-energy-2015-full-report.pdf>.

by the consumer countries, relatively recently emerged geopolitical and economic realities have challenged the effectiveness of this exchange mechanism.

Almost complete dependence on Russian pipeline network in exporting natural gas put Central Asian states in a very vulnerable position (low prices for oil and gas, economic dependence, political pressure, etc.). Thus, diversification of such dependence by building alternative pipeline networks promoted by regional and global gas customers was highly supported by Central Asian exporters. Projects to move gas to Europe avoiding Russia, increasing the capacity of the gas pipeline network to Iran and a TAPI project hypothetically significantly redrew regional energy map. However, so far only China succeeded to significantly challenge Russian monopoly on Central Asian gas import by constructing the longest gas pipeline in the world from Turkmenistan to China through Uzbekistan and Kazakhstan and oil pipeline from Kazakhstan to China.

Having experienced the negative impacts of excessive dependence on Russian pipelines, Central Asian exporters are now pursuing the diversification of gas export routes to obtain access to various gas markets while avoiding Russian territory. However, pipelines are the only cost-efficient way to transport gas from this land-locked region, and Central Asia is surrounded by larger powers (Russia, China, Europe, and India) that often compete for region's resources. Thus, particular consideration is required when pursuing the diversification of gas export routes. Since the Central Asian region is considered to be a source of energy for external customers, desire to increase the volume of imported gas may and is affecting availability of this particular type of resource for domestic and intra-regional consumption. From the energy security perspective external customers are those juicy hares that Central Asian countries chose to go after sacrificing the possibility to hunt a stag—a stable functioning of the CAES.

This section discusses factors that may threaten and that are already affecting security of gas supplies for the Central Asian countries, such as asymmetrically interdependent supply relations among state actors within the CAES, in which these actors interact and affect each other's security; insufficient volume of natural gas production to meet external demand without compromising internal consumption needs and gas exports to the neighbouring consumer countries.

Diversification of Central Asian Gas Exports

To secure reliable gas supplies regional exporters are attempting to establish symmetrical interdependent relations with major customers so that there is less incentive on either side to cause gas supply disruptions. Brenda Shaffer argues that energy security is provided when suppliers and consumers are interdependent in gas supply relations. The extent to which each side possesses alternative supply or market options, including transport infrastructure, determines the extent of interdependence in gas relations.⁶ On the one hand, the diversification of gas export routes ensures alternative ways of transporting it for energy consumers, which decreases the impact of technical failures or gas supply disruptions by either exporters or transit countries. On the other hand, diversification provides alternative energy markets for producers, which increases exporting countries' bargaining power so that they can sell gas at the highest possible price.⁷ In addition to the existing Turkmenistan-Iran gas pipelines, the newly constructed CAGP that runs from Turkmenistan through Uzbekistan and Kazakhstan to China decreased regional gas exporters' dependence on Russia. However, even though Central Asian exporters are now

⁶ Brenda Shaffer, *Energy Politics* (Philadelphia: University of Pennsylvania Press, 2009), 4.

⁷ Vaclav Hubinger, "Southern Corridor: A Strategy for Sustainable Energy Cooperation with Central Asia," *EUCAM Watch*, no. 4 (2009).

less vulnerable to unilateral disruptions of gas imports by Russia, they fall into the same trap by turning highly dependent on China.

There is clearly a demand for the region's gas resources, both within the region and by external customers. Taking into account the fact that Central Asia (mainly Kazakhstan, Turkmenistan, and Uzbekistan) possesses significant reserves, providing sufficient gas for both economic and population needs should not be a problem. However, despite considerable reserves, the overall gas supply-demand relations are far from being stable and reliable within the CAES.

Although, hypothetically, the diversification of gas transporting routes benefits both exporters and importers, many factors determine the success of such diversification:

- geography (the distance between exporting and importing countries; security/vulnerability of transport routes),
- political relations among energy actors,
- availability of sufficient energy resources to meet energy demand and transport
- infrastructure,
- policy (commitment to implement),
- resources (capacity and willingness to pay the price to secure access to alternative energy).⁸

Central Asian gas exporters' desire to further diversify export routes is understandable. However, policy makers must consider particular characteristics of the region and natural gas supply deals when pursuing the further diversification of export routes because supplying gas to alternative markets may not necessarily contribute to overall security within the CAES.

⁸ Vlado Vivoda, "Diversification of Oil Import Sources and Energy Security: A Key Strategy or an Elusive Objective?" *Energy Policy* 37 (2009): 4620, doi:10.1016/j.enpol.2009.06.007.

For a landlocked region such as Central Asia, cross-border pipelines are the only cost-efficient way to export gas. The construction of such pipelines requires significant investments from both the producer and customer sides. Because new international gas pipelines need to operate for at least fifteen to twenty years before investments can be recouped, natural gas is often traded within the framework of long-term supply contracts.⁹ These characteristics of the gas trade and the fact that the region is surrounded by major powers that often compete for energy resources establish a particular type of gas supply relations in which actors might be willing to use various political, economic, and military tools to force Central Asian exporting countries to fulfill their obligations at any cost. Although there have been partially successful efforts to diversify away from Russia and possibly obtain higher prices for the exported gas, this strategy is constrained by a lack of production capacity and the conflict between export desire and regional consumption needs.

The Monopoly of the Russian Pipeline System

In an attempt to decrease its dependence on Russia's pipeline network, some former Soviet republics adopted a "two-track" or "offend no one" foreign policy strategy. For instance, Azerbaijan could not afford to offend Russia but wanted to export its oil to the US and Europe. Thus, Azerbaijan opted for two export routes, one through Russia and another through Georgia. When the Russian route was closed due to the war in Chechnya in 1999, the two-track strategy proved to be very useful because Azerbaijan could still use the pipeline to Georgia.¹⁰ However, Central Asian energy producers did not or could not adopt a "two-track" strategy and remained significantly dependent on the Russian pipeline system for a long time.

⁹ Shaffer, *Energy Politics*, 38.

¹⁰ Daniel Yergin, *The Quest: Energy, Security and the Remaking of the Modern World* (New York: Penguin Press, 2011), 58.

There are two critical conditions that have always determined gas supply relations between Central Asian exporters and Russia: (a) Russia needs Central Asian gas to fulfill its commitments to the European customers; (b) Central Asian exporters used to be almost completely dependent on Russian pipeline infrastructure to move their resources to external markets. The Russian government effectively used Central Asian exporters' dependence on Russian pipelines to promote its economic and political interests. Central Asian gas producers had to sell their resources to Moscow, which partially re-exported that gas to Europe at two and sometimes three times the purchase price and also supplied its southern regions with the gas. Prior to the 2000s, the price paid by Russia for natural gas not only did not correspond to the market value of the gas, but was also often in the form of barter.

Turkmenistan has always been a major supplier of gas to and through Russia. While Turkmenistan produced 86 billion m³ in 1990, it consumed only 8 billion m³ and exported the rest to Russia and other former Soviet countries. However, after the collapse of the Soviet Union the demand for Turkmen gas started decreasing. Disagreements between Russian Gazprom and Turkmenistan in 1994 resulted in gas export disruption of Turkmen gas to Europe, because Russia no longer allowed Turkmen gas to flow through its pipelines. Russian representatives' visited Ashgabat in 1998 to resolve the tensions but failed to achieve any positive outcomes. Turkmenistan due to large debts by Ukraine, Georgia and Armenia also stopped exporting gas to these countries in 1997. As a result, gas production in Turkmenistan dropped to the level of only 17 billion m³ in 1997. Revenues from exporting gas accounted for two-thirds of GDP in the mid-1990s and thus gas export cuts seriously hit the budget and the overall economy.¹¹

¹¹ Nazar Alaolmolki, *Life after the Soviet Union: The Newly Independent Republics of the Transcaucasus and Central Asia* (Albany: State University of New York Press, 2001), 102.

Turkmenistan cut gas export to Ukraine due to a debt of US\$700 million in 1997. By the end of 1997 US\$185 million was paid off and two countries signed new agreement according to which Turkmenistan was supposed to supply up to 20 billion m³ up until 2005. It was agreed that Turkmenistan would receive 40 percent of payment in hard currency and 60 percent in goods and services.¹² Turkmenistan delivered 20 billion m³ of gas to Russia in 2000, which was paid in hard currency (40 percent) at the price of US\$36 and in food and commodities (60 percent). Turkmen side, however, was unhappy about the price for gas. During negotiations on gas supply to Russia, President of Turkmenistan Saparmurat Niyazov insisted on gas price of US\$42–45 per 1000 m³, but Russia considered it too high and proposed the price of US\$36 per 1000 m³, to what he stated: “let's calculate: You sell gas to Europe for US\$85 per 1000 m³ and you want to buy from us for US\$36.”¹³

In end of 1990s and the beginning of 2000s there were no long-term gas contracts and Russia purchased very small amount of Turkmen gas on an annual and semiannual basis. All attempts by the Russian side to draw Turkmenistan into a Russian-led alliance of gas exporting countries failed, because Niyazov refused to join any alliance unless Russia allowed Turkmenistan to export gas to Europe using Russia as a transit country only. To loosen up the tensions, Russia instead allowed Turkmenistan to supply gas to Ukraine. In May 2001 Turkmenistan signed another agreement with Ukraine to export around 250 billion m³ of gas in 2002–2006 with the payment of 50 percent in hard currency and remaining 50 percent in goods, services and investments. Russia, in its turn, benefited even from such trading arrangements as: a) it received transit fees; b) filling up Ukrainian market with Turkmen gas allowed Russia to

¹² Ian Jeffries, *The Countries of the Soviet Union at the Turn of the Twenty-first Century. The Baltic and European States in Transition* (London: Routledge, 2004), 583.

¹³ Marat Gurt, “Turkmenistan Stifles U.S. Gas Plans,” *The Moscow Times*, June 3, 2000, accessed May 15, 2014, <http://www.themoscowtimes.com/news/article/turkmenistan-stifles-us-gas-plans/262464.html>.

increase export of its own gas to Europe at much higher price; c) Russia reduced gas export to Ukraine, which had a reputation for falling behind in its payments.¹⁴

Since 2006, gas trade relations between Russia and Central Asian producers have taken the form of cash payments only. Discriminatory pricing, however, remained part of the Russian energy policy toward Central Asian producers. Russia purchased Turkmen gas at the price of US\$60 per 1,000 m³ in 2006. During the last quarter of 2006, the price rose to US\$100 per 1,000 m³, and it increased to US\$150 per 1,000 m³ in the second half of 2008.¹⁵ However, when Gazprom bought Turkmen gas for less than US\$100 per 1,000 m³ in 2006, it resold that gas through RosUkrEnergy to Europe for US\$250 per 1,000 m³.¹⁶ The inability to sell its resources directly to Europe was one of the reasons Turkmenistan and other gas exporters agreed to these terms.

In an attempt to block projects that could challenge its almost complete monopoly over the region's gas exports, Russia agreed to pay a higher price for Central Asian natural gas. Russia signed an agreement with Turkmenistan in 2008, according to which Russia was obligated to purchase Turkmen gas in the amount of 70–80 billion m³ per year for the European price of US\$350 per 1,000 m³.¹⁷ At that time the largest gas pipeline network—Central Asia Center (CAC)—with the capacity of up to 50 billion m³ was supposed to carry this gas to

¹⁴ Imogen Bell et al., *Eastern Europe, Russia and Central Asia 2003* (London: Europa Publications, 2002), 454.

¹⁵ . Tim Gould et al., "Perspectives on Caspian Oil and Gas Development," *IEA Directorate of Global Energy Dialogue* (2008): 11, accessed June 1, 2013, http://www.asiacentral.es/docs/caspian_perspectives_ia_dec08.pdf.

¹⁶ Gawdat Bahgat, "Europe's Energy Security: Challenges and Opportunities," *International Affairs* 82, no. 5 (2006): 961, doi:10.1111/j.1468-2346.2006.00580.x.

¹⁷ Creelea Henderson, "Shifting Sands in Central Asia: Geopolitics of Natural Gas Flows," *Perspective* 20, no. 2 (February 2010), accessed October 5, 2013, <http://www.bu.edu/iscip/Vol20/henderson.html>.

Russia.¹⁸ To increase the capacity of the CAC Russia was planning to build Pre-Caspian pipeline with the capacity of 20 billion m³.¹⁹

Due to the Russia–Ukraine gas crisis in 2009 and the economic recession, the European price for natural gas fell to US\$280 per 1,000 m³, which meant that Russia would lose from re-exports or swaps of the Central Asian gas to Europe according to the most recent agreement. Thus, Russia effectively used an explosion that occurred on the CAC as an excuse to cut gas imports from the region. Consequently, Turkmenistan experienced significant economic losses, which accounted for US\$1 billion every month during the period of cut-off.²⁰ Turkmen Foreign Ministry blamed the Russian side for the explosion by highlighting that “this accident was caused by a gross unilateral violation by Gazpromexport of the norms and rules of the natural gas sales agreement.”²¹ Anderi Grozin, director of the Central Asia Department at the CIS Institute in Moscow, stressed the seriousness of the nine months of gas export disruption by arguing that Turkmenistan owed its financial survival to a Chinese loan of 2 billion Euros.²²

As a result, export of Turkmen gas to Russia has been declining since 2009. Russia imported 42.6 billion m³ of Turkmen gas in 2007, 11.8 billion m³ in 2009, 10.95 billion m³ in 2013²³ and only 10 billion m³ in 2014. Moreover, Turkmenistan is expecting to reduce the

¹⁸ International Energy Agency, *Optimizing Russian Natural Gas. Reform and Climate Policy*, (Paris: International Energy Agency, 2006), <http://www.iea.org/publications/freepublications/publication/russianguas2006.pdf>.

¹⁹ Vladimir Socor, “Russia Resuming Gas Imports From Turkmenistan on a Small Scale,” *Eurasia Daily Monitor* 7, no. 1 (January 2010), http://www.jamestown.org/single/?tx_ttnews%5Btt_news%5D=35866&no_cache=1#.VaVAecZViko.

²⁰ “Central Asia Considers Alternatives to Gazprom for Exporting Gas. Will Silk Road Producers Actually Prefer Europe to Russia?” *Central Asian Online*, November 18, 2011, accessed June 5, 2013, http://centralasiaonline.com/en_GB/articles/caii/features/main/2011/11/18/feature-01?change_locale=true.

²¹ John C.K. Daly, “Pipeline Explosion Reveals Turkmenistan–Gazprom Rift,” *United Press International*, April 13, 2009, accessed May 15, 2014 http://www.upi.com/Business_News/Energy-Industry/2009/04/13/Pipeline-explosion-reveals-Turkmenistan-Gazprom-rift/16101239666679/.

²² Deirdre Tynan, “Gas Flows Again To Russia,” *While Discontent Simmers*, 2010, accessed March 4, 2014, <http://www.gundogar.org/?02200489660000000000000011000000>.

²³ “Gas Purchases,” *Gazprom official website*, n.d., accessed June 1, 2015, <http://www.gazprom.com/about/production/central-asia/>.

amount of gas export to 4.5 billion m³ in 2015.²⁴ In light of declining gas export to Russia, Turkmenistan has also accused Gazprom for delaying with payment for its gas, in response to which Gazprom filed a case in international arbitration court in Stockholm. A spokesman for the Gazprom said: “a lawsuit has been filed in Stockholm. The demand—a revision of prices.”²⁵ This whole situation may represent the declining Russian influence over the Turkmen gas sector. And the fact that most of the Turkmen gas is now heading toward Chinese direction implies that Russia has clearly lost its monopolist position over the transportation of gas to external markets. However, it is worth mentioning that this whole situation perfectly suits Russian interests as well. And Russia may use its political and economic leverage to force/encourage Turkmen suppliers to move gas to and through Russia when sending gas toward Northern direction turns beneficial for both Russia and Turkmenistan. For instance, Russia may tempt Turkmenistan to restore its gas supply to and through Russia in large quantities by allowing them to directly sign gas contracts with the European customers, which still pay the highest price for gas in the region.

Russia–Ukraine gas crisis and economic recession have also affected the volume of Uzbek gas export to Russia. While Uzbekistan supplied 9.6 billion m³ in 2007 and 15.4 billion m³ in 2009, the volume of export decreased to 8.7 billion m³ in 2012 and only 5.6 billion m³ in 2013.²⁶ It is expected that the export of Uzbek gas to Russia will drop to 1 billion m³ in 2015.²⁷ The volume of Kazakh gas exports to Russia has not undergone significant changes. The volume of Kazakh gas export to Russian accounted for 8.5 billion m³ in 2007, 10.1 billion m³ in 2009

²⁴ Sevinj Mamadova, “Changing Market Dynamics In Central Asia: Declining Russian Interests And Emerging Chinese Presence – Analysis,” *Caspian Center for Energy and Environment*, March 6, 2015, accessed May 15, 2015, <http://www.eurasiareview.com/06032015-changing-market-dynamics-in-central-asia-declining-russian-interests-and-emerging-chinese-presence-analysis/>.

²⁵ “UPDATE 1-Russia's Gazprom Says Files Case Against Turkmen gas Over Gas Price,” *Reuters*, July 24, 2015, accessed July 24, 2015, <http://uk.reuters.com/article/2015/07/24/russia-gazprom-turkmenistan-idUKL5N1041GE20150724>.

²⁶ “Gas Purchases.”

²⁷ Sevinj Mamadova, “Changing Market Dynamics In Central Asia.”

and 11.87 billion m³ in 2013.²⁸ Differently from Uzbek and Turkmen gas, Kazakhstan exports gas to Russia to be processed and returned back to the Kazakh market. Currently, Kazakhstan, due to increasing demand for gas and lack of pipeline infrastructure, is even importing gas via Bukhara–Ural gas pipeline, which was used to transport Uzbek gas to Russia and is now operated in reverse direction.²⁹

Russian monopoly over the gas exports from the region was challenged by the construction of Chinese pipeline networks. The current state of gas export–import relations in the region seems to perfectly meet all actors’ interests. By reducing gas exports to Russia Central Asian producers are increasing the volume of export toward Chinese direction. Ongoing dialogues between regional exporters and potential European and South Asian natural gas importers, however, show that the goal pursued by exporters is not merely to diversify their dependence on Russia, but also to obtain access to as many energy markets as possible. However, the realization of the ongoing and planned pipeline projects is likely to negatively impact availability of sufficient supply of gas in Central Asia.

The Pitfalls of Natural Gas Export Diversification

With all of the existing gas transportation projects upgraded and planned ones constructed, there is doubt that the Central Asian producers will be able to meet their supply obligations and to sensibly use the additional transport capacities. Russia remains an important customer of the regional gas via the CAC gas pipeline network, with the capacity to transport 45

²⁸ “Gas Purchases.”

²⁹ “Russian Gas Transit to China Through Kazakhstan is Less Viable — Expert,” *ITAR-TASS News Agency*, March 24, 2015, May 15, 2015, <http://tass.ru/en/economy/784580>.

billion m³ per year and, if upgraded, 90 billion m³ per year.³⁰ Russia has also been interested in the construction of the Pre-Caspian pipeline (from Turkmenistan via Kazakhstan to Russia) to significantly increase the overall capacity of the CAC.³¹ While current Russia–Ukraine crisis and economic sanctions against Russia is negatively affecting Central Asia–Russia gas trade Russian government might want to restore the volume of gas import when the conflict is over. Turkmenistan has planned to increase its gas supply to Iran from 6–8 billion m³ via Korpedzhe–Kurt–Kai pipeline³² built in 1997 to 20 billion m³ per year by fully operating new Dauletabad–Sarakhs–Khangiran pipeline constructed in 2010.³³ While Turkmenistan is capable of transporting 20 billion m³ to Iran the volume of transported gas never reached its full capacity. In 2014, Turkmenistan exported only 9 billion m³ of gas.³⁴ In an environment of economic blockade, Iran is also undergoing a major gas expansion program, which will make it possible to meet gas needs of Northern Iran on its own.³⁵ But, the Iranian direction was the first successful attempt to diversify Turkmenistan’s complete dependence on Russia. Turkmenistan exported gas to Iran when the Russian demand was decreasing. And, now by limiting the volume of gas export to Iran, Turkmen authorities will be able to increase gas export capacity to China. The Iranian direction has always played an important role in Turkmenistan’s foreign energy policy. Besides

³⁰ International Energy Agency, *Optimizing Russian Natural Gas. Reform and Climate Policy*, (Paris: International Energy Agency, 2006), accessed October 31, 2012, <http://www.iea.org/publications/freepublications/publication/russiagas2006.pdf>.

³¹ Vladimir Socor, “Russia Resuming Gas Imports From Turkmenistan on a Small Scale,” *Eurasia Daily Monitor* 7, no. 1 (January 2010), accessed May 1, 2013, http://georgiandaily.com/index.php?option=com_content&task=view&id=16309&Itemid=132.

³² “Saparmurat Niyazov Inaugurates Gas Compressor Station at Korpeje Natural Gas Field,” *Turkmenistan.ru*, September 14, 2005, accessed June 20, 2014, http://www.turkmenistan.ru/?page_id=3&lang_id=en&elem_id=7108&type=event&sort=date_desc.

³³ “Turkmenistan, Iran Launch Gas Pipeline,” *Pipeline and Gas Journal* 238, no. 1 (2011), accessed September 1, 2012, <http://www.pipelineandgasjournal.com/turkmenistan-iran-launch-gas-pipeline>.

³⁴ Danila Bochkarev, “EU Investment in Turkmenistan’s Energy Upstream: Mission Impossible?” *European Energy Review*, April 30, 2015, accessed May 25, 2015, <http://europeanenergyreview.com/site/pagina.php?id=4363>.

³⁵ “Turkmenistan Boosting Gas Exports to China.”

direct exports of gas, Turkmenistan might also be interested in extending the volume of swap-based gas supply arrangements with Iran to export resources to external markets.

Among the major planned pipeline projects, the TAPI pipeline, with a capacity of 33 billion m³ per year,³⁶ and the Trans-Caspian project, with a capacity up to 30 billion m³ per year,³⁷ stand out. President of Turkmenistan Gurbanguly Berdymukhamedov during his speech at the VI International Gas Congress on May 19, 2015 highlighted that he truly believes in the successful implementation of the TAPI project.³⁸ The idea to build the TAPI pipeline first emerged in the middle of 1990s. However, no progress has been achieved so far. The economic viability of the project and security challenges in Afghanistan are considered the biggest challenges along the way toward promoting the TAPI project. While the Asian Development Bank has carried out feasibility study of the project and found it economically viable and showed even the willingness to financially support the construction of the TAPI pipeline,³⁹ no party has taken a responsibility to cover or significantly contribute to the construction of the pipeline with the total cost of US\$7.6–10 billion.⁴⁰

The EU has always been interested in getting access to the Central Asian gas reserves avoiding the Russian territory. A 300-kilometers long pipeline is designed to move Turkmen gas beneath the Caspian Sea and connect it to the Trans-Anatolian pipeline to supply gas

³⁶ “Turkmenistan–Afghanistan–Pakistan–India [TAPI] Pipeline,” *Ministry of Mines and Petroleum Islamic Republic of Afghanistan*, accessed July 25, 2015, <http://mom.gov.af/en/page/4717>.

³⁷ N. Hasanov, “Negotiations on Trans-Caspian Gas Pipeline Held Successfully in Brussels,” *TREND*, March 10, 2012, accessed June 1, 2014, <http://en.trend.az/capital/energy/2001834.html>.

³⁸ “Obespechenie Globalnoy Energobezopasnosti–Faktor Ustoychivogo Razvitiya (Global Energy Security is a Guarantor of Sustainable Development),” *Ministry of Oil and Gas Industry and Mineral Resources Journal*, May 28, 2015, <http://www.oilgas.gov.tm/publikatsii/item/435>.

³⁹ “Turkmenistan–Afghanistan–Pakistan–India [TAPI] Pipeline.”

⁴⁰ Danila Bochkarev, “Another Pipe Dream?” *Natural Gas Europe*, March 25, 2015, accessed May 15, 2015, <http://www.naturalgaseurope.com/another-pipe-dream-22882>.

through Azerbaijan and Turkey to Europe.⁴¹ The leaders of Turkmenistan, on the one hand, and Turkey/European states, on the other, reached a framework agreement according to which Turkmenistan was to supply 16 billion m³ to Turkey and 14 billion m³ to Europe via the Trans–Caspian gas pipeline. However, the customers wanted to pay for gas only when it reached Turkish border, while Turkmenistan did not want to take responsibility for the transit of its gas through Azerbaijan and Georgia and refused to sign up under the detailed construction proposal in 2000. A new Turkmen President Gurbanguly Berdymukhammedov revived the interest in the Trans–Caspian pipeline. Only this time, no one had to worry about Azerbaijan, as the Deputy Foreign Minister of Azerbaijan said, “if the project is implemented, Azerbaijan will take part with great pleasure.”⁴²

Maros Sefcovic, EU Energy Commissioner, has visited Turkmenistan in May 2015 to give new impetus to the negotiations over the Trans–Caspian gas pipeline. Moreover, mass media reported quoting him that “Europe expects supplies of Turkmen gas to begin by 2019.”⁴³ The Trans–Caspian pipeline is part of a bigger pipeline network to move Azeri gas to Turkey and Europe. And the Trans–Anatolian pipeline is already under construction. Technologically, laying down the pipeline beneath the Caspian Sea is no longer a serious obstacle either. There are, however, several challenges that can further postpone the construction of the pipeline. Turkmen gas will not entirely replace Russian gas to Europe, since Europe currently imports around 150

⁴¹ Vladimir Socor, “Aliyev, Erdogan Sign Inter-Governmental Agreement on Trans–Anatolia Gas Pipeline to Europe,” *Eurasia Daily Monitor* 9, no. 122 (June 2012), accessed May 15, 2015, http://www.jamestown.org/programs/edm/single/?tx_ttnews%5Btt_news%5D=39545&tx_ttnews%5BbackPid%5D=27&cHash=2e9f386bf569ef7ea670cde5a5c3784c#.VaBs6sZViko.

⁴² Foreign Affairs Committee, *Global Security: Russia: Second Report of the Foreign Affairs Committee of Session 2007–08: Report, Together with Formal Minutes, Oral and Written Evidence* (The Stationery Office, 2007), 44

⁴³ Paolo Sorbello, “Europe and Turkmenistan Make Nice,” *The Diplomat*, May 17, 2015, accessed May 17, 2015, <http://thediplomat.com/2015/05/europe-and-turkmenistan-make-nice/>.

billion m³ of Russian gas, which accounts for about 30 percent of its total annual gas imports.⁴⁴ However, Turkmen gas will be an important source to decrease the extent of Europe's dependence on the Russia gas and cost Russia both money and political leverage. As a result, Russia could easily use undetermined legal status of the Caspian Sea not to let Turkmenistan and Azerbaijan proceed with the construction without the consent of all littoral states.⁴⁵ Turkmenistan is currently trying to keep up with Chinese demand for gas and the European customers will most likely be pulled into a competition for the region's resources.

However, even without the TAPI and the Trans-Caspian pipelines, existing gas trading arrangements may still result in a mismatch between a region's production capacity (without compromising regional consumption needs) and external demand for Central Asian gas. The reason for that is rapidly growing Chinese demand and Central Asian producers' obligation to supply over 80 billion m³ of gas to China. Talks between Chinese and Turkmen leaders on the possibility to move Turkmen gas to China started in 2006 and already in 2009 resulted in the construction of the first line of the Central Asia-China gas pipeline. Turkmenistan was initially obliged to export annually 30 billion m³ of gas to China according to the agreement signed in 2006. However, the new agreement that was signed two years later increased the volume to 40 billion m³ per year by 2015. During the Shanghai Cooperation Organization's summit in Beijing in June 2012, the countries' presidents, Hu Jintao and Gurbanguly Berdimukhamedov, agreed to

⁴⁴ Jason Bordoff and Trevor Houser, "American Gas to the Rescue? The Impact of US LNG Exports on European Security and Russian Foreign Policy," *Center for Global Energy Policy* (September 2014): 29, accessed May 14, 2015, http://energypolicy.columbia.edu/sites/default/files/energy/CGEP_American%20Gas%20to%20the%20Rescue%3F.pdf.

⁴⁵ Barbara Janusz, "The Caspian Sea Legal Status and Regime Problems," *Chatham House* (August 2005), accessed May 23, 2015, <https://www.chathamhouse.org/sites/files/chathamhouse/public/Research/Russia%20and%20Eurasia/bp0805caspian.pdf>.

increase the amount of gas exports even further, to 65 billion m³ per year.⁴⁶ China will be receiving an additional 10 billion m³ per year from Uzbekistan according to the agreement signed in 2010.⁴⁷ China has already turned into the largest importer of Turkmen gas. Turkmenistan exported 45.1 billion m³ in 2014, out of which 35 billion m³ went to China.⁴⁸ Uzbekistan is expecting to deliver 10 billion m³ of gas to China in 2015 against 6 billion m³ in 2013.⁴⁹ Kazakhstan is planning to supply gas to China when the second phase of the Beineu–Bozoy–Shymkent pipeline, which connects Kazakh gas fields with Line–C, is put on line.⁵⁰

In fact, there are already signs that it would be quite challenging for some regional gas exporters to increase their export capacity. For instance, outdated and inefficient natural gas transportation systems, growing internal demand, and the fact that no major natural gas reserves have recently been explored are indications of Uzbekistan's physical incapability to increase its exports. The fact that Uzbekistan had to cut its gas export to Russia for 40 days to meet its internal needs in 2012⁵¹ and that it supplied less than the agreed amount of gas to Tajikistan (132 million m³ instead of 155 million m³ of gas)⁵² in 2012 and completely stopped gas export since 2013 can be considered signs that Uzbekistan will face challenges in supplying annually

⁴⁶ Vladimir Socor, "China to Increase Central Asian Gas Imports Through Multiple Pipelines," *Eurasia Daily Monitor* 9, no. 152 (August 2012), accessed March 5, 2013, http://www.jamestown.org/single/?no_cache=1&tx_ttnews%5Btt_news%5D=3975.1.

⁴⁷ "Central Asia–China Gas Pipeline, Turkmenistan to China," *Hydrocarbons-technology*, n.d., accessed May 1, 2013, <http://www.hydrocarbons-technology.com/projects/centralasiachinagasp/>.

⁴⁸ "Turkmenistan Boosting Gas Exports to China."

⁴⁹ "Uzbekistan to Decrease Gas Supplies to Russia, Increase to China," *UzDaily*, October 9, 2014, accessed May 12, 2015, <http://www.uzdaily.com/articles-id-29513.htm>.

⁵⁰ "Construction of Beineu-Bozoi-Shymkent Gas Pipeline to Wrap up by Year End," *Kazinform International News Agency*, February 25, 2014, accessed May 20, 2015, <http://www.inform.kz/eng/article/2634098>.

⁵¹ "Uzbekistan Vozobnovil Eksport Gaza v Rossiyu Posle Mesyachnogo Pereryva (Uzbekistan Restored Export of Gas to Russia after a Monthly Disruption)," *Kazenergy*, January 29, 2013, accessed May 5, 2014, <http://kazenergy.com/ru/press/2011-04-21-10-41-35/7764-2013-01-29-11-07-35.html>.

⁵² Erkin Akhmadov, "Uzbekistan Introduces New Laws on Gas Supply," *CACI Analyst*, January 9, 2013, accessed May 5, 2014, <http://www.cacianalyst.org/?q=node/5905>.

approximately 15 billion m³ of gas to Russia,⁵³ 10 billion m³ to China, and 4.5 billion m³ within the Tashkent–Shymkent–Bishkek–Almaty pipeline system.⁵⁴ The volume of Uzbek gas export to Russia is expected to decline to 1 billion m³ in 2015.⁵⁵ Given the fact that there has been no natural gas production boom in Central Asia and the region’s gas export capacity remains at approximately 65–70 billion m³ per year, even Turkmenistan, with its massive gas reserves, may face technical, economic, and security challenges to keep up with external demand. By reducing gas exports in almost all other directions only, Turkmenistan is currently able to gradually increase the volume of its gas supply to China. It is also not clear to what extent Kazakh authorities would prioritize ensuring sufficiency on its own gas market (southern and south-eastern regions) over the increasing export capacity to China.

Competing Energy Markets

Having experienced the negative consequences of excessive dependence on the Russian pipelines, Central Asian exporters started pursuing diversification of gas export routes to obtain access to various energy markets. However, the Central Asian region is considered to be a source of gas for external customers. Thus, increasing the volume of gas exports may have a reverse affect on availability of gas for domestic and intraregional consumption.

Energy actors promote regional cooperation through six priority gas corridors. Taking into account limited gas production capacity, however, regional gas trade within one corridor

⁵³ Farkhad Sharip, “Uzbekistan’s Quest for Aral Sea Oil May Weaken Kazakhstan’s Position in the Caspian,” *Eurasia Daily Monitor* 9, no. 23 (2012), accessed June 1, 2014, http://www.jamestown.org/single/?no_cache=1&tx_ttnews%5Btt_news%5D=38962.

⁵⁴ US EIA, *Kazakhstan—Analysis* (Washington, DC: US EIA, n.d), accessed March 20, 2014, <http://www.eia.gov/countries/cab.cfm?fips=KZ>.

⁵⁵ Sevinj Mamadova, “Changing Market Dynamics In Central Asia: Declining Russian Interests And Emerging Chinese Presence – Analysis,” *Caspian Center for Energy and Environment*, March 6, 2015, accessed May 25, 2015, <http://www.eurasiareview.com/06032015-changing-market-dynamics-in-central-asia-declining-russian-interests-and-emerging-chinese-presence-analysis/>.

may negatively impact availability of resources for trade within another. Gas export capacity of Kazakhstan, Turkmenistan and Uzbekistan to the external markets does not currently exceed 65–70 billion m³ per year. Even though the Central Asian producers are not supplying gas in all five directions and some corridors (to South Asia and Europe avoiding Russia) due to financial, geopolitical and security reasons have low probability of near future realization, there are already signs that regional exporters may not be able to keep up with growing demand within already connected corridors (Russian and Chinese directions and intra-Central Asian cooperation):

- Central Asia–East Asia (CAGP: over 80 billion m³ per year)
- Central Asia–South Asia (TAPI project: 33 billion m³ per year)
- Intra-Central Asia Cooperation (up to 6 billion m³ per year)
- Central Asia–Russian Federation (CAC: up to 50 billion m³ per year)
- Central Asia–European Union (Trans–Caspian Pipeline: around 30 billion m³ per year)
- Turkmenistan–Iran (up to 20 billion m³ per year).

Simple interest in importing Central Asia gas does not turn exiting and potential customers into direct competitors. Certain conditions, however, upon which gas supply relations over the Central Asian gas are being developed imply the possibility for a more active competition. Once the expensive pipelines are put in place, in the construction of which (potential) consumers cover significant share of the cost, importers will make sure that the pipeline operates in its full capacity, to first return their investments and then profit from the export/import relations. Over time consumers' economies will turn dependent on this imported gas, which will further increase customer's interest in obtaining resources.

The current situation with the Central Asian gas export is tricky, which instigates regional producers, especially Turkmenistan, to look for alternative markets. Gas export diversification-

oriented energy policy, however, may overshadow the consequences of it for the energy security of the exporting states and security of the CAES in general. European sanctions against Russia and tensions between Central Asian upstream and downstream countries have led to the decreasing gas trade volume within the Russian and intra-Central Asian corridors. According to the gas contract signed between Turkmenistan and Russia in 2003, the former was supposed to supply up to 70–80 billion m³ annually via CAC pipeline. However, the amount of gas export in the Russian direction decreased to 10 billion m³ in 2014.⁵⁶ Uzbekistan decreased the volume of gas supply to Kyrgyzstan from 800 million m³ in 2000 to 280 million m³ in 2013.⁵⁷ Tajikistan is currently completely cut off the Uzbek gas supply chain. Turkmenistan exported around 6 billion m³ of gas to Iran in 2013 and was expected to keep the export volume in the amount of 9–10 billion m³,⁵⁸ which is still less than targeted 20 billion m³ after the construction of the second gas pipeline connecting these two countries. Rapidly increasing gas export to China is balancing or in some cases instigating gas supply drops in other directions.

Since the European and South Asian markets are not yet physically connected to the Central Asian gas reserves, the volume of gas export and thus, dependence of the Central Asian producers on the Chinese market is increasing. To decrease such dependence, Turkmenistan is showing even greater interest in promoting the South Asian and European corridors, which are yet in the planning stage.⁵⁹ Once stability, on the Russian and European fronts, is more or less restored, under the condition that the demand for gas is expected to increase, powers interested in Central Asian resources will try to reinstate gas supply/transit relations. But again even though it

⁵⁶ Mikhail Serov, “Turkmeniia Nedovol’na ‘Gazpromom’ (Turkmenistan is not Happy about ‘Gazprom’),” *Vedomosti*, February 17, 2015, accessed May 1, 2015, <http://www.vedomosti.ru/newspaper/articles/2015/02/17/turkmeniia-nedovolna-gazpromom>.

⁵⁷ Otorbaev, “Problems and Perspectives for the Development of Power.”

⁵⁸ Ilham Shaban, “Milestone Year for Turkmen Gas Export to China?” *Natural Gas Europe*, February 10, 2015, accessed May 25, 2015, <http://www.naturalgaseurope.com/milestone-year-in-turkmen-gas-export-to-china>.

⁵⁹ “Global Energy Security is a Guarantor of Sustainable Development,” *Ministry of Oil and Gas Industry*.

is unlikely that bigger powers' competing energy interests will take the radical form of competition for resources, their influence (political, economic, security) over Central Asian producers and regional elites' desire to profit from exports may result in an increasing gas supply to external markets even at the expense of domestic consumption. Both customers and suppliers will keep the domestic energy supply at the level that does not provoke social instability or economic crisis. It is not, however, the minimum survival level, but rather the ability to enjoy sufficiency of gas supplies that constitutes the core of energy security in this context.

It is expected that gas consumption in China and India will amount to 603 billion m³ and 202 billion m³, respectively, by 2040.⁶⁰ Gas consumption forecast shows increasing demand for this particular type of energy source in all major energy markets, including Europe by 2040.⁶¹ Turkmenistan positions itself as an important source to meet growing demand for gas in these directions, which claims to be capable of increasing its gas production capacity from the current level of 70 billion m³ up to 230 billion m³, by 2040.⁶² Both Kazakhstan and Uzbekistan have also been signing gas contracts to increase the volume of export to China and showing willingness to move gas in other directions. However, due to growing domestic demands and the increasing volume of wasted gas in highly inefficient gas transporting and consumption facilities, there are serious doubts regarding Central Asian producers' ability to keep up with external demand without negatively affecting the level of energy security in their respective countries. An attempt to increase the volume of gas exports to external customers threatens security of the CAES by affecting availability of gas for domestic and intra-Central Asian consumption.

⁶⁰ "Posledovatel'niy Rost Znachimosti Turkmenistana na Mejdunarodnom Gazovom Rinke (Increasing Role of Turkmenistan in the International Gas Market)," *Ministry of Oil and Gas Industry and Mineral Resources Journal*, April 28, 2015, accessed May 5, 2015, <http://www.oilgas.gov.tm/neftegazovyyj-sektor/item/402>.

⁶¹ David Livingston and Deborah Gordon, "EU Energy Exchange: Balancing Security, Economy, and Climate Goals," *Carnegie Energy and Climate Program*, August 27, 2014, 9, accessed June 1, 2015, http://carnegieendowment.org/files/EU_EX%20Conference%20Report-Final%20Dft-SS%20NP-CTG-WEB.pdf.

⁶² Increasing Role of Turkmenistan in the International Gas Market," *Ministry of Oil and Gas Industry*.

On the one hand, inability to meet growing demand may lead to a conflict of interests and a more active form of competition between customers. On the other hand, it affects sufficiency of gas for producers' internal consumption. While the Central Asian corridor due to its relatively insignificant volume of gas trade should not seriously threaten availability of natural gas to external customers, regional producers' own desire to generate higher revenues and importing states' direct interest in moving gas out results in export increase even at the expense of domestic and intra-Central Asian consumption. In this regard, the creation of broader gas markets negatively affects intra-Central Asian energy cooperation. Moreover, gas supply shortage within Central Asia forces upstream states to push forward their giant HPP projects and thus, further escalate water-energy nexus conflict.

Despite the fact that there are energy shortages for regional consumption, Central Asian gas producers will most likely continue increasing their export capacity to meet growing international demand. There are two major reasons for regional exporters' willingness to restrict domestic consumption in favour of increasing export capacity: first, regional exporters are attempting to compensate their economic losses from subsidizing gas for domestic consumption by generating higher revenues from gas exports; second, asymmetrical power relations between Central Asian gas producers and such external customers as Russia, China, and, potentially, Europe/US will force regional exporters to go along with the system (in which gas export to the external markets is prioritized) rather than challenge it.

Energy Subsidies, Energy Efficiency

One of the reasons for Central Asian gas exporters' policies of restricting domestic consumption through rationing is the use of subsidized gas for political purposes domestically. Low prices for gas on the domestic market result in over-consumption and lower profits for

producers (both private and state-owned companies), making it unattractive to invest in upgrading domestic gas infrastructure that can significantly increase efficiency to avoid gas waste and expanding pipeline networks to supply distant regions and a larger number of people with gas.⁶³ In 2011, natural gas subsidies cost US\$4.36 billion to the budget of Turkmenistan. In Uzbekistan, subsidies amounted to US\$9.09 billion.⁶⁴ While Uzbekistan spends in total more money on subsidies than Turkmenistan, per capita Turkmen government subsidized US\$1593.4 in 2013, whereas Uzbek and Kazakh subsidies accounted for US\$406.1 per capita and US\$358.6 per capita, respectively. Uzbekistan and Turkmenistan spend over 20 percent of their GDP on subsidizing fossil fuels supplies. Average subsidization rate Turkmenistan 65.7 percent, Uzbekistan 58.7 percent and Kazakhstan 32.8 percent.⁶⁵ Revenues from the export of gas compensate the economic loss from the subsidized energy market and thus export-oriented energy policy would remain a priority for the regional producers.

Losses caused by outdated and inefficient gas production and transportation infrastructures cost Uzbekistan approximately 4.5 percent of its GDP every year.⁶⁶ Kazakhstan consumes only half of its overall gas production and exports the other half because it lacks extensive internal gas supply networks to transport resources from the resource-rich regions to distant consumption centers.⁶⁷ Increasing the volume of gas by building large production facilities seems to be a priority area for regional producers. However, according to some experts,

⁶³ Clements et al., *Energy Subsidy Reform: Lessons and Implications* (Washington: International Monetary Fund, 2013), accessed August 5, 2014, <http://www.imf.org/external/np/pp/eng/2013/012813.pdf>.

⁶⁴ International Energy Agency, *Fossil Fuel Consumption Subsidy Rates as a Proportion of the Full Cost of Supply 2013* (Paris: International Energy Agency, n.d), accessed January 10, 2015, <http://www.iea.org/subsidy/index.html>.

⁶⁵ International Energy Agency, *Fossil Fuel Consumption Subsidy Rates as a Proportion of the Full Cost of Supply, 2013* (Paris: International Energy Agency, n.d), accessed June 15, 2015, <http://www.iea.org/subsidy/index.html>.

⁶⁶ World Bank Group, *Uzbekistan: The Economics of Efficiency. Uzbekistan Pushes to Reduce Energy Consumption in Industry* (Washington, DC: World Bank, 2013), accessed March 5, 2014, <http://www.worldbank.org/en/results/2013/04/30/uzbekistan-the-economics-of-efficiency>.

⁶⁷ Naubet Bisenov, "Neighbourly Negotiations," *Energy Global*, 2013, accessed June 15, 2014, www.energyglobal.com/news/pipelines/articles/Neighbourly_negotiations_an_analysis_of_central_asian_energy_pipelines.aspx.

because the level of gas loss at the consumer end is extremely high, investments in energy projects to increase efficiency would most likely cost about half as much as building new facilities with almost the same results.⁶⁸ For instance, even though Uzbekistan ranks 24th worldwide in terms of gas reserves,⁶⁹ poor transportation and distribution infrastructures accounted for losses of 20 billion m³ of natural gas per year in the beginning of 2000s.⁷⁰ Inefficient energy transportation and consumption facilities still account for 60 percent of primary energy loss in the country.⁷¹ Another example is the CAC pipeline network, which was designed and built in 1966–1987 with an overall capacity of about 90 billion m³ per year. The lack of maintenance and investment over time has almost halved the operational capacity of the system to less than 50 billion m³ per year.⁷² According to the International Energy Agency, at least 30 billion m³ of gas is annually wasted. Even the Gazprom representatives acknowledge that investments in the pipelines would save up to 10 billion m³ of gas annually.⁷³ Figures significantly vary depending on different sources, but what is important is that in any case gas losses in the region are still very high. Low gas prices in the domestic markets make it unattractive for the government and private enterprises to invest in improving gas sector. In an attempt to compensate financial losses caused by subsidizing domestic gas markets, Central Asian producers are increasing their gas export capacity, which is negatively affecting sufficiency of domestic consumption.

⁶⁸ Natalia Mirimanova, “Interview with Rainer Behnke,” *Europe-Central Asia Monitoring* (2009), accessed March 5, 2014, http://www.eucentralasia.eu/fileadmin/PDF/Commentaries/Interview_INOGATE.pdf.

⁶⁹ British Petroleum Company, *BP Statistical Review*.

⁷⁰ Jacob Townsend and Amy King, “Sino-Japanese Competition for Central Asian Energy: China's Game to Win,” *China and Eurasia Forum Quarterly* 5, no. 4 (2007): 27.

⁷¹ World Bank, “Uzbekistan: The Economics of Efficiency.”

⁷² International Energy Agency, “Optimizing Russian Natural Gas.”

⁷³ Michael Fredholm, “Natural Gas: An Expensive Trickle,” *Transitions Online*, April 10, 2008, accessed July 1, 2009, <http://www.tol.org/client/article/19509-an-expensive-trickle.html?print>.

Asymmetrical Power Relations within the Central Asian Energy System

Central Asian gas producers' attempt to reduce their gas exports dependence on Russia by establishing interdependent relations with external customers was successful, to a certain extent, especially with China. In 2009 the dominance of Russia, with its century-long cultural and political ties to the Central Asian region, but with aging pipelines in the energy sector, was challenged by China.⁷⁴ However, there is still asymmetry in the extent of vulnerability to gas supply/demand disruptions for producers within the CAES. The higher the cost of the termination or drastic alteration of gas relations for an actor, the more vulnerable this actor is.⁷⁵ Currently, most of the Central Asian gas is transported through Chinese and Russian pipelines. However, neither China nor Russia considers Central Asian gas a vital source for their economy. Russia needed Central Asian gas mainly to fulfill its supply obligations to Europe. While Central Asian gas represents approximately half of all imported gas, it yet accounts for only insignificant share of the Chinese overall energy consumption. China consumed 170 billion m³ in 2013. Central Asian producers supplied in total over 27.5 billion m³ of gas, which was around 16 percent of the total gas consumption. Taking into account the fact that gas represented around 5 percent of the total primary energy consumption in 2013, the share of the Central Asian gas does not exceed 1 percent of it.⁷⁶ Given the fact that selling natural gas accounts for approximately half of Turkmenistan's⁷⁷ budget and significantly contributes to Kazakhstan and Uzbekistan's budgets, Central Asian gas exporters are more vulnerable to gas supply disruptions than either

⁷⁴ Garrison and Abdurahmonov, "Explaining the Central Asian Energy Game," 382.

⁷⁵ Robert O. Keohane and Joseph S. Nye, *Power and Interdependence: World Politics in Transition* (Boston: Little, Brown, 2001).

⁷⁶ Business News Europe, "Central Asia Supplies Close to Half of Chinese Gas Imports in 2013," *The Uyghur American Association*, June 18, 2014, accessed June 1, 2015, <http://uyghuramerican.org/article/central-asia-supplies-close-half-chinese-gas-imports-2013.html>.

⁷⁷ Stratfor Contributor, "Difficulties Loom For A Turkmen-China Energy Deal," *Forbes*, August 3, 2011, accessed December 4, 2013, <http://www.forbes.com/sites/energysource/2011/03/08/difficulties-loom-for-a-turkmen-china-energy-deal/>.

Russia or China.⁷⁸ Central Asian producers are currently increasing gas supply to China by reducing the volume of export in other directions, thus, swapping their dependence on the Russian infrastructure into dependence on the Chinese market. The amount of gas being exported to China from Central Asia is growing fast and it is important to meet gas needs of the western regions of China. However, Central Asian gas still covers relatively insignificant share of the Chinese overall primary energy consumption. Thus, Central Asian producers will remain more vulnerable to potential gas supply disruptions to China than the Chinese economy could potentially suffer from supply cut-offs.

Due to asymmetrical power relations within the CAES, some countries hold power advantages over others, in which the latter are very limited in their foreign policy choices. In this sense, more vulnerable states are likely to go along with the pattern, in which energy export to external markets is prioritized.⁷⁹ However, in an attempt to increase their bargaining power, regional exporters support various gas export diversification projects. However, regional exporters' physical inability to produce sufficient gas to meet international demand may lead to competition between external customers for the region's gas. The Shanghai Cooperation Organization is the only (and quite vague) institutional framework to regulate gas export/import relations between regional producers and major customers (China and Russia).⁸⁰ In the absence of an effective enforcement mechanism to coordinate gas supply relations, the consequences of such competition are unpredictable.

If the Central Asian gas exporters are relatively weaker players in the gas export/import relations with China and Russia, they are in a far better position to dictate terms of gas supply

⁷⁸ Townsend, and King, "Sino-Japanese Competition for Central Asian Energy," 23.

⁷⁹ Jean A. Garrison and Ahad Abdurahmonov, "Explaining the Central Asian Energy Game: Complex Interdependence and How Small states Influence their Big Neighbors," *Asian Perspective* 35 (2011): 387.

⁸⁰ Mehmet Ogutcu and Ma Xin, "Geopolitics of Energy: China and the Central Asia," *Insight Turkey* 9, no. 4 (n.d.), 55, accessed September 20, 2014, http://files.setav.org/uploads/Pdf/ogutcu_ma.pdf.

relations with the Central Asian consumer countries. Tajikistan and Kyrgyzstan's gas reserves are insignificant, and these countries rely on imports from Kazakhstan, but mostly unreliable Uzbekistan. For instance, gas supply disruptions from Uzbekistan and Turkmenistan to Tajikistan in 2008 caused countrywide electricity blackouts throughout the entire winter period.⁸¹ Uzbekistan has also stopped gas supply to southern Kyrgyzstan in 2013 without any warning. According to general director of "Kyrgyzgaz" Turgunbek Kulmurzaev: "Uztransgaz [state-owned energy company of Uzbekistan] stopped gas supply at night without any warning and we don't know the reason, because no one is answering the phone in Uzbekistan." Kyrgyz government acknowledged that it owed US\$88,000 to Uzbekistan, but the sum was not critical enough to cut gas supply without warning.⁸² Even though Kyrgyzstan has developed seven oil fields and two gas fields, difficult geological conditions keep the recovery rate very low.⁸³ Neither Kyrgyzstan nor Tajikistan is capable of influencing the foreign policy of Uzbekistan. Besides, increasing the volume of exports to external customers is negatively effecting intra-Central Asian gas consumption.

During the summer of 2008, the outlet of water to produce electricity increased. This significantly decreased the level of water in the reservoirs for the winter to generate electricity to meet at least the minimal internal consumption needs.⁸⁴ The price hike for Uzbek gas and reduced amount of gas imports worsened the level of energy security in Tajikistan and Kyrgyzstan. Just before the winter, Uzbekistan doubled the price of natural gas exported to Tajikistan. Although the government of Tajikistan persuaded Uzbek authorities to decrease the

⁸¹ Laldjebaev, "The Water-Energy Puzzle in Central Asia," 23–36.

⁸² "Uzbekistan Prekratil Podachu Prirodnogo Gaza na Yug Kirgizii (Uzbekistan Stopped Gas Supply to Southern Kyrgyzstan)," *Kazenergy*, July 18, 2013, accessed November 5, 2014, <http://kazenergy.com/ru/press/2011-04-21-10-41-35/10102-2013-07-17-20-23-18.html>.

⁸³ James P. Dorian, "Central Asia: A Major Emerging Energy Player in the 21st Century," *Energy Policy* 34 (2006): 548, doi:10.1016/j.enpol.2005.11.009.

⁸⁴ Laldjebaev, "The Water-Energy Puzzle in Central Asia," 29.

gas price from US\$300 to US\$240 per 1,000 m³ (US\$90 higher than the previous price),⁸⁵ it was still higher than the price Tajikistan was willing to pay.

Having experienced severe energy shortages in the past, Kyrgyzstan and Tajikistan want to speed up the construction of the Rogun and Kambarata HPPs. For Tajikistan and Kyrgyzstan, increasing hydro-power potential to meet their electricity needs has become a national security priority. Taking into account the huge hydro-power potential of these countries, the construction of the Kambarata I and Rogun HPPs will increase their bargaining power vis-à-vis Uzbekistan and may provide greater energy security.

⁸⁵ Laldjebaev, “The Water-Energy Puzzle in Central Asia,” 30.

Security of the Central Asian (Electric) Power System

The CAPS was established in the 1960s and 1970s. The system consisted of mainly 30 percent HPPs of Central Asian upstream and 70 percent TPPs of downstream countries.¹ The Integrated Dispatch Center Energia, based in Tashkent, controlled the electric power supply operations of the CAPS. Even though the CAPS was part of the Unified Energy System of the USSR, physically it was isolated from the Russian electricity grids. Nonetheless, Energia was still subordinate to the Central Dispatch Center based in Moscow and financed by the Ministry of Energy and Electrification of the former Soviet Union.² After the collapse of the Soviet Union, the CAPS started operating on its own. Also called the Central Asian “electricity ring,” CAPS connected all 83 power units (including 29 thermal and 48 hydro) of the southern part of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan and was managed by Energia.³ Fifty-one percent of total CAPS electricity was generated in Uzbekistan, 13.8 percent in Kyrgyzstan, 9.1 percent in Kazakhstan, 15 percent in Tajikistan, and 10 percent in Turkmenistan.⁴

The resource-sharing mechanism ensured reliable and stable energy supplies up until recently. Following the well-functioning pattern, Tajikistan and Kyrgyzstan ensured a continuous flow of water and hydroelectricity to downstream countries. Kazakhstan, Turkmenistan, and Uzbekistan in turn channelled light oil products, gas, and thermal electricity to their upstream neighbours. The CAPS not only solved the problem of uneven distribution of electricity, but also prevented electricity supply disruptions due to seasonal variations of electric power production in

¹ Kh. A. Shamsiev, “Coordination and Dispatch Center ‘Energy’ Issues of Regional Cooperation within the Central Asia Integrated Power System,” 2009.

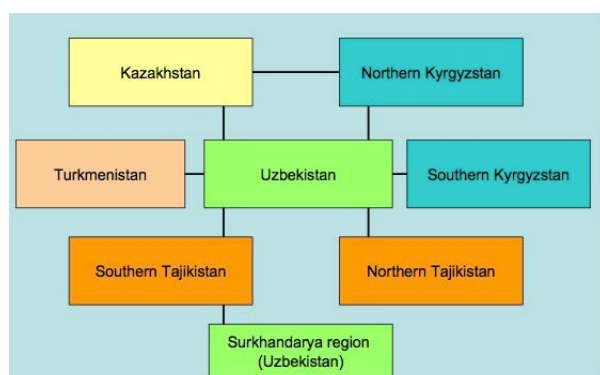
² Ibid.

³ Regional Economic Cooperation in Central Asia, Asia Development Bank, “Electric Energy,” *Final Report RETA 5818* (2000): 11.

⁴ Ibid., 19.

the region. Despite the fact that everyone benefitted from cooperation within the CAPS, formally the system collapsed under the pressure of geopolitical processes in the region in 2009. That year, Uzbekistan withdrew from the “electricity ring.” Turkmenistan left the CAPS even earlier, in 2003.⁵ Central Asian countries’ electric power grids are no longer managed by Energinia. However, regional electric power systems remain physically connected to each other. Electricity trade with sometimes-prolonged disruptions still take place. Central Asian countries are still very much dependent on each other to ensure efficiency, sustainability and sufficiency of electricity supplies. All these conditions imply the necessity to consider Central Asian countries’ electric power sectors within the unified system, perhaps, malfunctioning, but the system of interdependent national electric power sectors.

Figure 7: The Central Asian Power system Major Interlinkages

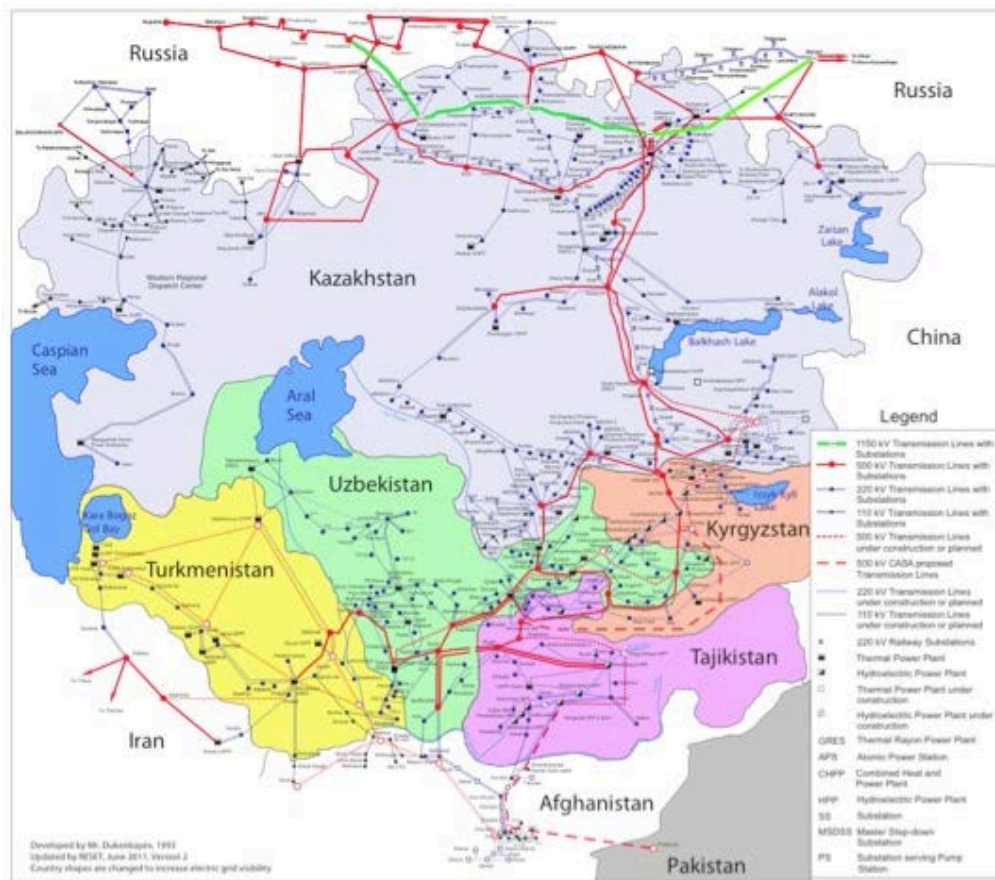


The CAPS, as designed during the Soviet period, incorporated electric power systems of southern Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, and Turkmenistan. The national electric power system of Kazakhstan is divided into three loosely connected internal networks: northern, western, and southern power zones. Northern and, to certain extent western regions of Kazakhstan are mostly connected to the Russian electric power grid. The southern regions of the

⁵ Sebastien Payrouse, “Central Asian Power Grid in Danger,” *CACI Analyst*, September 2009, accessed July 20, 2013, <http://old.cacianalyst.org/?q=node/5232/print>.

country received electricity from the CAPS. The central role in the CAPS was devoted to Uzbekistan. Since the CAPS was designed irrespective of national borders, due to Uzbekistan's central geographical location, it was economically cost-efficient to establish the network of transmission lines connecting all other countries through the territory of Uzbekistan.

Figure 8: Central Asian (Electric) Power System⁶



After Uzbekistan's withdrawal from the CAPS, Tajikistan, which heavily relies on hydroelectricity export to pay for the fossil fuel imports needed to mitigate its winter supply shortages, had to redirect its some electricity supply flow to Afghanistan and speed up the construction of Rogun, the highest HPP in the world. Kyrgyzstan was forced to largely count on

⁶ "Central Asia Power System," *Exploring Kazakhstan and Post-Soviet Central Asia, One Steppe at a Time*, n.d. accessed December 20, 2013, <http://onesteppetatime.wordpress.com/2012/06/08/central-asia-power-system/>.

Kazakhstan and Russia to meet its winter energy needs and search for investors to share the cost of the second-largest Kambarata–1 HPP to start the construction process as soon as possible. Central Asian downstream countries, however, perceive the construction of giant HPPs as a factor that can negatively affect the water withdrawal balance in the region. To prevent full-scale realization of these projects, Uzbekistan used its political, economic, and energy leverage to influence the decision making of upstream states. Conflict over the water withdrawal and electricity supply within the CAPS without establishing self-sustaining electric power systems are negatively affecting Central Asian countries' energy security. While Central Asian states have a history of cooperation in the electric power sector and have all the necessary preconditions to engage in mutually beneficial electricity trade, Central Asian states still fail to coordinate their policies to respond to energy security challenges. After the collapse of the Soviet Unified Energy System, every Central Asian state started thinking about the possibility of strengthening its national energy system, including electric power system. It is, however, Uzbekistan's withdrawal from the CAPS that forced other regional state actors to give up the policy focused on sustaining a unified electric power system in which everyone's interests are met and concentrate on establishing their own countrywide electric power systems through a painful transformation process. Going after small hares prevents them from hunting a bigger stag—the security of the CAPS.

Water and Energy Modes of the HPP

During the Soviet period, HPPs in Central Asia were designed first to ensure stable water release for irrigation purposes and then to generate electricity. Two major dams, Nurek and Toktogul, were built to regulate water flows, supply sufficient water for irrigation purposes, and prevent floods that could damage downstream countries' agricultural sector and especially cotton

industry.⁷ It was later decided to build two other giant dams/HPPs (Rogun and Kambarata–1) to strengthen water management in the region.

Receiving large quantities of water during the vegetation period has always been important for downstream Central Asian states. The Soviets promoted an active policy to expand irrigated lands in Central Asia, particularly Uzbekistan. As a result, Uzbekistan's irrigated land increased from 1.2 million hectares in 1913 to 4.2 million hectares in 1990. Its agricultural sector was specialized in cotton production and was accounting for two-thirds of all cotton produced in the Soviet Union.⁸ Cotton production together with some other crops cultivation consumed over 90 percent of water resources from Amu Darya and Syr Darya.⁹ Cotton industry remains an important part of Uzbek economy and the government obliges Uzbek farmers cultivate about 60–70 percent of their farmland with cotton and wheat, meaning that Uzbekistan is still highly dependent on large quantities of water.¹⁰ Currently, cotton accounts for 9 percent of the total export of Uzbekistan.¹¹ That is why Uzbekistan is concerned about any major projects in its upstream neighbours capable of affecting existing water distribution balance.

The general schemes of Rogun and Kambarata dams were designed in Tashkent (Uzbekistan). Working in the water mode, Nurek, the largest HPP in Tajikistan, was never capable of accumulating enough water to produce significant volume of electricity in winter and Toktogul HPP, with the capacity to potentially accumulate enough water to produce electricity

⁷ Ernest Karibekov, "Plyus Elektrifikacii Vsey Strane. Stranam Centralnoy Azii Nujna Novaya Model Edinoy Energosistemi (Countrywide Electrification Pluses. Central Asian Countries Need New Model of the Unified Energy System)," *Centralasia.ru*, June 3, 2012, accessed August 5, 2014, <http://www.centrasia.ru/newsA.php?st=1338670560>.

⁸ David Tarr and Eskender Trushin, "Did the Desire for Cotton Self-Sufficiency Lead to the Aral Sea Environmental Disaster?" in Nariya Khasanova, "Revisiting Water Issues in Central Asia: Shifting from Regional Approach to National Solutions," *Central Asia Fellowship Papers*, no. 6 (October 2016): 7, <https://app.box.com/s/fornzf5490xyou1juaw0>.

⁹ G.N. Golubev, *Systems View of the Water Management in Central Asia* (in Russian) (Moscow State University, Faculty of Geography, 2001) in Nariya Khasanova, "Revisiting Water Issues in Central Asia," 8.

¹⁰ Djanibekov et al, *Pros and Cons of Cotton Production in Uzbekistan* (Case-study 7–9, Cornell University, 2010) in Nariya Khasanova, "Revisiting Water Issues in Central Asia," 10.

¹¹ Central Asia Data Gathering and Analysis Team, "Trade Policies and Major Export Items," 12.

any time of the year, mostly generated electricity in the summertime.¹² In the 1990s, to keep the water mode functioning, Central Asian countries signed a number of agreements, according to which downstream states were ensured stable water supply for irrigation purposes. In exchange, Central Asian upstream countries received natural gas, oil products, and thermal electricity in wintertime to meet their energy demands.

However, when Uzbekistan withdrew from the CAPS and it was no longer possible to ensure coordinated operation of the unified electric power system, Tajikistan and Kyrgyzstan decided to turn the water mode of operating HPPs into the energy mode focused on producing as much electricity as possible whenever there was a need.¹³ Both Tajikistan and Kyrgyzstan, having experienced deficiency of gas and winter electricity supplies, transformed their energy sectors first to meet their needs and second to significantly increase electricity export capacity. Currently, Central Asian upstream countries continue releasing water to downstream neighbours during the vegetation period for two main reasons. First, they are bound by intergovernmental agreements (Nukus Declaration (1995), Protocol 566 (1987) and agreements on using the waters of the Syr Darya and Amu Darya rivers—Syr Darya Framework Agreement (1998) and Agreements on Hydrometeorology and Parallel Operation of Energy systems (1999)).¹⁴ Second, and most importantly, Tajikistan and Kyrgyzstan are physically incapable of accumulating a large amount of water to produce electricity both in summer and winter. When Uzbekistan withdrew from the CAPS, Tajikistan was left in complete isolation. With no possibility to export electricity, both Tajikistan and Kyrgyzstan had to spill water. The governments of the Central

¹² Asian Development Bank, Technical Assistance Consultant, *Central Asia Regional Economic Cooperation: Power Sector Regional Master Plan* (Metro Manila: Asian Development Bank, Report no. 43549, 2012), accessed January 15, 2015, <http://adb.org/sites/default/files/projdocs/2010/43549-01-reg-tar.pdf>.

¹³ Karibekov, “Plus Electrification to the Whole Country.”

¹⁴ Eli Keene, “Solving Tajikistan’s Energy Crisis,” *Carnegie Endowment for International Peace*, March 25, 2013, accessed June 17, 2014, <http://carnegieendowment.org/2013/03/25/solving-tajikistan-s-energy-crisis>.

Asian upstream countries are counting on the Rogun and Kambarata–1 dams to increase their ability to accumulate more water.

Filling the planned Rogun and Kambarata dams with water will take many years and may cause reallocation of water shares in Central Asia. Melted glaciers are main source of water flow in rivers in Central Asia. However, glaciers in the mountains have been rapidly receding in the region. Glacier volume changes in both Kyrgyzstan and Tajikistan accounted for around 100 km³ (out of 500 km³ and 600 km³ respectively) over the last 50 years and are expected to continue in the same amount for the next half-century.¹⁵ Calculations of the volume of water needed to fill dams were based on the water flow already under the condition of glacier melt. Thus, we cannot expect any significant increase in water flow from the receding glaciers in Tajik and Kyrgyz mountains. Besides, the fact that these dams will most likely be operated in energy mode suggests that water will be accumulated in summertime when downstream countries need it the most and released in winter. The generation capacities from Kambarata–1 HPP may allow Toktogul to return to irrigation mode with minimal effect on the current water withdrawal balance. Central Asian downstream states, however, fear that building new HPPs will take many years and new generation capacities will produce electricity for export, forcing Toktogul to continue operating in energy mode.¹⁶

Main Source of Disagreements—Giant HPPs

Around 80 percent of water in Central Asia is generated in upstream Tajikistan and Kyrgyzstan. More than 85 percent of it, however, is consumed by downstream Kazakhstan,

¹⁵ Vladimir Fedorenko, “Prospects for Water Cooperation in Central Asia,” *Rethink Paper* 14 (February 2014): 14, accessed March 25, 2015, <http://www.rethinkinstitute.org/wp-content/uploads/2014/02/Fedorenko-Prospect-of-Water-Coop.pdf>.

¹⁶ Karibekov, “Plus Electrification to the Whole Country.”

Turkmenistan, and especially Uzbekistan. While such distribution of water perfectly suits downstream countries' interests, authorities of Tajikistan and Kyrgyzstan believe it is unfair and advocate for non-interference into their energy/water policy in regard to increasing their water accumulation and electricity production capacity.¹⁷ To increase electricity production upstream states have to accumulate more water in the summer and release it in winter as well as reduce the amount of water to be released until dams are filled up. The Government of Tajikistan argues that the construction of large HPP facilities is the sovereign right of the state, and will be in full compliance with international law.¹⁸

Central Asian region still has the highest rate of water withdrawal per capita in the world and Uzbekistan,¹⁹ with half the population of the region, accounts for around 50 percent of the total water withdrawal. Water quotas for transboundary rivers in Central Asia are allocated as follows:

- Amu Darya
 - Uzbekistan: 48.2 percent
 - Turkmenistan: 35.8 percent
 - Kyrgyzstan: 0.6 percent
 - Tajikistan: 15.6 percent
- Syr Darya
 - Uzbekistan: 50.5 percent
 - Kazakhstan: 42 percent

¹⁷ Sunnatullo Jonboboev, Personal Interview, Senior Research Fellow at the University of Central Asia in Tajikistan, Astana, Kazakhstan, May 25, 2014.

¹⁸ Ekaterina Klimenko, "Central Asia as a Regional Security Complex," *Central Asia and Caucasus Press* 12, no. 4 (2011).

¹⁹ Olli Varis, "Resources: Curb Vast Water Use in Central Asia," *Nature*, October 1, 2014, accessed January 25, 2015, <http://www.nature.com/news/resources-curb-vast-water-use-in-central-asia-1.16017>.

- Kyrgyzstan: 0.5 percent
- Tajikistan: 7 percent.²⁰

The high rate of water consumption in Uzbekistan is explained by the domination of the water-intensive cotton industry in its agricultural sector, which accounts for over 90 percent of water consumption, and the fact that 70 percent of river water does not reach irrigated land owing to deteriorated infrastructure.²¹ Reforms to increase the efficiency of Uzbekistan's irrigation infrastructure and introduce water saving technology are not progressing quickly enough to make a difference.

Most of the hydro-power generation facilities in Central Asia are run-of-river-type HPPs generating electricity only in summer. The only exception in the region is the Toktogul HPP, which has a storage capacity large enough to produce electricity even in winter and transmit it to the north of the country via a newly constructed 500 kV line.²² Most of the other HPPs of the Narin cascade are connected to the Uzbekistan's electricity grid. In return, Uzbekistan has been transmitting electricity to Kazakhstan, part of which was then sent back to Kyrgyzstan while the rest was retained for Kazakhstan's electricity needs. Northern parts of Tajikistan are also connected to Uzbekistan's electric power grid. When Uzbekistan withdrew from the CAPS, electricity exchange between Kyrgyzstan and Kazakhstan via the electricity network of Uzbekistan remained operational to some extent, while Tajikistan was left in complete isolation. Kyrgyzstan is currently importing electricity as well as oil products and gas from Kazakhstan and Russia. The Kyrgyz government has recently completed the Datka–Kemin electricity transmission lines connecting the north and south, but has made no progress in building

²⁰ Jenniver Sehring, *The Politics of Water Institutional Reform in Neo-Patrimonial States: A Comparative Analysis of Kyrgyzstan and Tajikistan* (Springer Science & Business Media, 2009), 71.

²¹ Rakhmatullaev et al., "Water Reservoirs, Irrigation and Sedimentation in Central Asia," *Environmental Earth Sciences* 68, no. 4 (2013) in Nariya Khasanova, "Revisiting Water Issues in Central Asia," 12.

²² Asian Development Bank, Technical Assistance Consultant, "Power Sector Regional Master Plan," 3–3.

Kambarata–1. The situation is, however, quite serious in the case of Uzbekistan–Tajikistan energy relations. The largest water reservoir in Tajikistan is Nurek, but it has limited capacity and must generate full electricity output in summer or spill water.²³ Severe energy shortages explain Tajikistan’s desire to have at least one (Rogun) reservoir large enough to store water to produce electricity in wintertime. This project, however, turned out to be one of the main reasons for disagreements between Uzbekistan and Tajikistan.

Table 19: Some of the Main Controversies with Respect to the Governance of Water Resources in the Region²⁴

		KAZ	KGZ	TJK	TKM	UZB
Priorities of use	Electricity Generation	NA	X	X		
	Irrigation				X	X
Water-trade regime	Monetization	X	X	X		
	Barter (status quo)				X	X
Release-regime	Power regime		X	X		
	Irrigation regime	X			X	X
Water-sharing criteria	Per capita					X
	Status quo	X	X	X	X	
Quotas regime	Revisionist		X	X		
	Status quo	X			X	X
Compensation for water storage	Revisionist	NA	X	X		
	Status quo				X	X

The Tajik government expects the Rogun HPP to serve three major purposes: produce electricity in wintertime; increase electricity export capacity; and improve water management. Tajikistan, like any other country in the region, has a right to increase electricity exports to generate revenue. Moreover, improved water management is in the interests of both upstream and downstream countries. However, only increased electricity production in winter contributes

²³ Asian Development Bank, Technical Assistance Consultant, “Power Sector Regional Master Plan,” 2–17.

²⁴ Victor Jensen, “Hydroelectric Dams and Conflict in Central Asia,” *Central Asia Regional Data Review* 1, no. 1 (September 2009).

to national energy security. While Rogun can potentially add summer electricity production capacity, which would be exported, revenues generated from increasing electricity exports does not guarantee the possibility of wintertime gas and thermal electricity imports from neighbouring states.

There is a belief that Uzbekistan is against the Rogun HPP; in fact, it finds the proposed heights of the dam threatening to downstream countries (335 m, 3,600–2,800 MW; 300 m, 3,200–2,400 MW; and 265 m, 2,800–2,000 MW).²⁵ Official statements by the Uzbek government emphasize the consequences of a dam failure, which according to them, may potentially cause a 245–280 m high wave at the start-point and a 6–7 m high wave in the Republic of Kazakhstan, endangering 5 million people, including 3 million living in Uzbekistan in a flooded area of 1.3–1.5 million hectares.²⁶ Tajik authorities, on the other hand, emphasize a recently released World Bank report on the environmental and social impact assessment of the Rogun dam showing that the highest possible option of the dam is the most economically efficient, with acceptable environmental impact, compared to other alternatives.

However, what Uzbekistan fears most is the fact that the construction of the Rogun and Kambarata–1 HPPs will decrease the current level of water flow to downstream neighbours. Tajik authorities ensure that to fill up the Rogun reservoir (the expected time is 16 years), Tajikistan will use the amount of water allocated to it according to the Nukus Declaration and Protocol 566, which has been spilled out so far. Under the Nukus Declaration, Tajikistan has a right to use 15.4 percent of the Amu Darya river water and Uzbekistan is granted 48.2 percent.

²⁵ OSHPC Barki Tojik, *Techno-Economic Assessment Study for Rogun Hydroelectric Construction Project* (World Bank, 2014), accessed October 5, 2014, http://www.worldbank.org/content/dam/Worldbank/document/eca/central-asia/TEAS_Executive%20Summary_Final_eng.pdf.

²⁶ World Bank, *To Executive Secretary, The Inspection Panel* (Washington, DC: World Bank, 2010), accessed May 10, 2014, http://siteresources.worldbank.org/ECAEXT/Resources/258598-1297718522264/Request_for_Inspection_Eng.pdf.

Tajikistan is currently withdrawing less water than is allocated to it according to the agreements. Both Uzbekistan and Turkmenistan's quota from Amu Darya rivers was 22 km³ in 2011, but they consumed 28.2 and 29.4 km³ respectively.²⁷ Many years of using this extra water has made Uzbekistan's agricultural sector dependent on it. Infringing on the amount of water rightfully allocated to Tajikistan and Kyrgyzstan is something Uzbekistan is not ready to do.

Construction of Rogun is not only an issue of electricity production, but also a matter of saving the Tajik hydro-power sector. "If Tajikistan fails to build Rogun HPP, it will lose Nurek HPP," said the head of dispatch center of Barki Tojik national holding, Odin Chorshanbiev. The process of silting in the Nurek dam poses a serious threat and if measures are not taken, the dam will lose its capacity to store water in 20 years. Building Rogun would release clean water to Nurek located down the Vakhsh river stream. If Rogun is not built, even cleaning technologies would not save Nurek and it will only operate on a run-off basis. Currently, Nurek provides 70 percent of the country's electricity.²⁸

Diversifying Hydro Power Supply Routes

Intra-Central Asian electricity trade ensured security of the CAPS. However, regional electricity trade that accounted for 25 GWh per year in 1990 dropped to the level of 4 GWh per year in 2008 and has been further decreasing since then.²⁹ Decreasing intra-Central Asian electricity trade and frequent electricity supply disruptions forced Central Asian upstream countries to consider building alternative electricity supply routes. Tajikistan and Kyrgyzstan's excessive dependence on thermal electricity imports from neighbouring countries makes them

²⁷ Nariya Khasanova, "Revisiting Water Issues in Central Asia," 3.

²⁸ Asian Development Bank, CAREC Unit, *Pushing for Energy Security and Trade in the Region* (Metro Manila: Central Asia Regional Economic Cooperation Program, n.d), accessed September 15, 2014, <http://www.carecprogram.org/index.php?page=energy>.

²⁹ Asian Development Bank, Technical Assistance Consultant, "Power Sector Regional Master Plan," 1.

vulnerable to electricity supply disruptions. For instance, electricity supply cuts from Uzbekistan and Turkmenistan to Tajikistan in 2008 caused countrywide electricity blackouts throughout the whole winter period. To address electricity deficiency due to such supply disruptions, Kyrgyzstan and Tajikistan started establishing independent electric power systems.

Over 90 percent of Kyrgyzstan's electricity is generated from hydro resources in the central parts of the country, while the major consumption is in the north. There is only one 500 kV transmission line connecting the Toktogul HPP with the north of the country. The other four HPPs in the Naryn cascade are connected to the 220 kV grid located in the Fergana part of the Uzbek electric power system. The electricity exchange between Kyrgyzstan, on the one hand, and Kazakhstan and Uzbekistan, on the other, in the end of the 1990s and the beginning of the 2000s was conducted approximately within the following formula:

From the Republic of Kazakhstan (annually):

- thermal electricity: 150 million kWh
- coal: 150 thousand tonnes

From the Republic of Uzbekistan (annually):

- natural gas: 500 million m³
- thermal electricity: 54 million kWh
- fuel oil: 15 thousand tonnes

From Kyrgyz Republic to the neighbouring states annual hydroelectricity supplies:

- to the Republic of Kazakhstan: 1100 million kWh
- to the Republic of Uzbekistan: 1100 million kWh.

During the 1999 summer period, Tajikistan provided the return of electricity to Kazakhstan and Uzbekistan in a 1:1 ratio.³⁰

Until 2009, Central Asian countries' electric power systems operated in coordination with each other. That is why there were no payments for transit of electricity through the Central Asian electric power grids. The payment mechanism, first based on barter, was later applied only to export/import relations. When Uzbekistan withdrew from the CAPS, the payment mechanism was introduced even for transit of electricity. However, Kyrgyzstan stopped paying transit fees for electricity transited from Toktogul HPP to the southern Batken region of the country. The construction of the Datka electric power station 30 km from Djalal Abad and the modernization of several transmission lines ensured some electricity supply to its southern regions.³¹ Tajikistan has also constructed some south–north electricity transmission lines. When these projects connecting northern and southern parts of Tajikistan and Kyrgyzstan are completed, hypothetically they will be able to establish connections between each other and Kazakh electric power grids entirely avoiding Uzbek territory.

CASA-1000

When Uzbekistan withdrew from the CAPS, Kyrgyzstan continued electricity trading with Kazakhstan. Tajikistan, however, was completely isolated from other Central Asian states. Possessing a surplus of electricity production in the summertime with no possibility to export it to the neighbouring Uzbekistan, the Tajik government decided to redirect extra electricity to

³⁰ Protocol of the Workshop for the Representatives of Water and Energy Authorities of the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan and the Republic of Uzbekistan Related to Water and Energy Use Issues in the Forthcoming 1998/9 Fall-winter Season and 1999 Vegetation Period (1999), accessed May 20, 2015, <http://www.ce.utexas.edu/prof/mckinney/papers/aral/agreements/Annual-Protocol-99.pdf>.

³¹ Dmitriy Denisenko, "Kirgizstan Prekratil Platit' Uzbekistanu za Transit Elektroenergii (Kyrgyzstan Stopped Paying Uzbekistan for Power Transit)," *Vb.kg*, January 24, 2014, accessed January 25, 2014, http://www.vb.kg/doc/259320_kyrgyzstan_prekratil_platit_uzbekistany_za_tranzit_elektroenergii.html.

Afghanistan. Both Tajikistan and Kyrgyzstan supported the Central Asia–South Asia Regional Electricity Market (CASAREM) initiative to move surplus electricity to South Asia. As the first phase of this initiative, CASA–1000 is expected to supply electricity to Afghanistan and Pakistan from the current surplus in Tajikistan and Kyrgyzstan. Even though CASA–1000 excludes India as a potential beneficiary, hypothetically, India might benefit from the Central Asian hydro-power potential in case electricity production in upstream Central Asian countries increases (with the construction of the Rogun and Kambarata–1 HPPs) and electricity transmission lines are extended to India. However, concerns regarding the security of electricity supply infrastructure and economic viability of the project as well as lack of electricity production in Tajikistan and Kyrgyzstan pose serious challenges for South Asian states to pursue their energy interests in the region.

Currently, Central Asian countries' installed power generation capacity accounts for around 25,000 MW, out of which 9,000 MW is hydro power (36 percent) including major Nurek HPP (3,000 MW) and Toktogul HPP (1,200 MW), and 16,000 MW is thermal power (64 percent). However, real production capacity does not exceed 20,000 MW,³² mostly because of decreasing hydro-power generation in upstream countries. In addition, South Asian countries are interested in winter electricity supplies. Uninterrupted electricity supply to South Asian countries can be achieved only with large TPPs operating to export thermal electricity and there are none in Tajikistan or Kyrgyzstan. CASA–1000 was initially counting on electricity generated on Uzbekistan's TPPs to supply electricity to South Asia 295 days/year. However, Uzbekistan did not sign up under the project and now Tajikistan and Kyrgyzstan will only be able to supply

³² Igor Tomberg, "Energy Industry in Central Asia – Challenges and Prospects," *Russian International Affairs Council* (2012), accessed March 4, 2013, http://russiancouncil.ru/en/inner/?id_4=350#top.

electricity for 70 days.³³ In this regard, if the CASAREM initiative is implemented, it will require significant volume of Central Asian electricity to be heading to the South Asian market, even at the expense of domestic consumption. Moving electricity out to external markets, even though it generates much-needed revenue, does not contribute to improving energy security in Central Asia.

Regional Energy Trade versus the Rogun HPP in the Short-term Perspective

Tajikistan, which heavily relies on hydro power to pay for the fossil fuel imports needed to mitigate its winter supply shortages, after it was isolated from Uzbekistan had to redirect its electricity export to Afghanistan. Since Uzbekistan stopped selling gas to Tajikistan from January 2013, despite the fact that Tajikistan had been offering a good price, shows that earning money by exporting electricity to pay for Uzbek gas will not necessarily ensure gas flow from its neighbour. In an attempt to improve its energy security, Tajikistan prioritized exploitation of its hydro-power potential through the construction of the Rogun HPP. The Rogun HPP will increase electricity production in general, but most importantly will make it possible to produce electricity in the wintertime. The current Kyrgyz government has acknowledged that Kambarata–1 would not entirely save Kyrgyzstan from the energy crisis in the short-term. Besides, Kyrgyzstan can rely on Russia and Kazakhstan to improve its energy security and to meet wintertime electricity demands. There is also a possibility for Kyrgyzstan to build a Kara–Keche coal-fired TPP to increase availability of electricity all year round.³⁴ Tajikistan, on contrary, does not enjoy either of these options. Therefore, the president of Tajikistan did not give up the idea of building Rogun

³³ Rovshan Dovlatov, “Energeticheskiy Proekt po Postavkam Elektroenergii iz Stran Centralnoy Azii v Yujnuyu Aziyu Budet Realizovan Prejde Vsego po Politicheskim Motivam (Energy Project to Supply Electricity from Central Asia to South Asia will be Implemented Primarily for Political Reasons),” June 27, 2013, accessed September 1, 2014, <http://expertonline.kz/a11231/>.

³⁴ Ernest Karibekov, Personal Interview, Head of International Public Fund “Research Institute for the Central Asian Water and Water-Energy Resources Problem Studies”, Bishkek, Kyrgyzstan, February 4, 2014.

in the near future, which he turned into a symbol of energy security and independence of the country.

However, in the short- to medium-term perspective, the energy security of the country can be ensured only through a combination of developing its hydro-power potential with import of thermal electricity and gas from neighbouring countries. In other words, the exchange/swap/trade of electricity to improve security of the CAPS can contribute to the energy security of Tajikistan. There is no guarantee that if Tajikistan and Kyrgyzstan postpone the realization of the Rogun and Kambarata–1 projects, one of the main sources of disagreements, Uzbekistan will restore functioning of the CAES or allow them to use its energy infrastructure to transit resources from Turkmenistan and Kazakhstan. Even if Uzbekistan were to provide a 100 percent guarantee of this sort, some scholars believe that it could not be enough to placate Kyrgyzstan and Tajikistan and for symbolic and revenue-generating reasons, Kyrgyzstan and Tajikistan might still not back down.³⁵ But the analysis shows that giant HPPs may not contribute to energy security as expected in the short-run and restoring regional trade is not only the better option, but the necessary one.

The 335 m high Rogun HPP can almost double current production (16.5 billion kWh per year) by adding 13 billion kWh per year. However, it will take up to 16 years until the plant starts operating in its full capacity.³⁶ During this period, electricity production in winter will remain limited. Taking into account the fact that Tajikistan does not possess sufficient funds to

³⁵ Comment provided by Edward Schatz, an Associate Professor of Political Science at the University of Toronto, June 9, 2015.

³⁶ World Bank, “Environment and Social Impact Assessment for Rogun Hydro Power Plant, Analysis of Alternatives” (V Round of Dialogue on Technical and Economic/Environmental and Social Impact Assessment of the Rogun, Almaty, Kazakhstan, July 14, 2014).

complete the project (worth US\$3–6 billion³⁷) and foreign investors are not rushing to invest in a project that may lead to a conflict with Uzbekistan, Rogun's large-scale contribution to energy security will most likely be further delayed.

Current high security risks affect the investment climate, in which to further pursue construction of the dam, Tajikistan will be forced to accept terms not serving its best interests.³⁸ Tajikistan has already refused to agree on investment terms offered by Russian companies demanding a higher stake (75 percent) in benefits distribution. Almost similar investment terms were accepted by Tajikistan for the construction of Sangtuda–1 HPP and electricity produced in this plant is now being mostly exported, since the Russian side has to recover its investments. Export of electricity produced in Sangtuda affects the availability of electricity for domestic consumption. In this regard, it is preferable to look for foreign investments only after the security issues over the Rogun dam are more or less resolved. Besides, economic sanctions against Russia, which have had a profound impact on the Russian economy, negatively affect any desire or ability to participate in a large energy project such as Rogun.

Designed to ensure electricity supply to meet peak demand in winter, there is no guarantee that the Rogun HPP will not be extensively used for export purposes. There is currently a surplus of electricity production in Tajikistan and Kyrgyzstan and it is argued that CASA–1000 is supposed to transport it to southern neighbours. However, Afghanistan and Pakistan are mostly in need of electricity import in winter and only Rogun and Kambarata–1 can

³⁷ David Trilling, "Tajikistan: Rogun Dam a Hot Topic As Tajiks Make It Through Another Winter of Shortages," *EurasiaNet.org*, March 12, 2009, accessed May 20, 2013, <http://www.eurasianet.org/departments/insightb/articles/eav031309f.shtml>.

³⁸ Muzaffar Olimov, Personal Interview, Senior Scientist at the Tajik Academy of Sciences Institute of Language, Literature, and Oriental Studies, Astana, Kazakhstan, November 17, 2014.

provide it.³⁹ In this sense, Kyrgyzstan and Tajikistan may decide to increase export of electricity even at the expense of domestic consumption. The desire to export electricity in wintertime will make Rogun and Kambarata–1 economically attractive, but with a limited contribution to energy security projects. This does not mean that Tajik and Kyrgyz authorities should give up trying to implement these projects. Given their interest in generating extra revenue, they most likely will not do so in any case. What it means, though, is that the contribution of these projects to each country's energy security might be limited.

Tajikistan does not have the financial resources to complete the construction of the Rogun HPP. The cost of the project is estimated at US\$3–6 billion. The total sum is not, of course, required all at once, since the construction will take many years. But in combination with other urgent investment-intensive energy projects, such as building small HPPs and upgrading infrastructure to improve energy efficiency, it will be difficult for Tajikistan to make significant progress. So far, Tajikistan has been counting on multilateral institutions' support, but the Asian Development Bank, a major contributor, announced that it would not finance the Rogun HPP and build CASA–1000 electric power transmission lines.⁴⁰ Tajikistan will probably seek external state contributions (Russian and Chinese, and potentially also Iranian and Indian) to complete Rogun. Negotiations with Russia have already failed due to disagreements over the control share once the HPP is completed. Chinese investors are unlikely to become involved unless regional conflict over the project is resolved or they seriously consider importing Central Asian electricity to meet China's domestic needs. Currently, China prioritizes importing Central Asian oil and

³⁹ President of the Republic of Tajikistan, *The Annual Message to the Majlisi Oli of the Republic of Tajikistan* (Dushanbe: President of the Republic of Tajikistan, 2011), accessed June 5, 2014, <http://www.prezident.tj/en/node/2189>.

⁴⁰ “ABR Otkazalsya Finansirovat Stroitelstvo Rogunskoy GES I LEP v Pakistan (ADB Refused to Finance the Construction of Rogun HPP and ETL to Pakistan),” *Regnum.ru*, January 17, 2014, accessed January 20, 2014, <http://www.regnum.ru/news/1755635.html>.

gas, and would not sacrifice friendly relationships with the transit country—a significant source of Central Asian gas—to participation in the construction of large HPPs.

Even if the Tajik government succeeds in finding investors to share the cost of Rogun, there is a threat that most of the produced electricity would be exported with insignificant contribution to the country's energy security. While ordinary people's payment capability is limited, electricity for the major consuming facilities are subsidized by the government. Foreign investors are only willing to provide money if they are sure that their investments will soon be returned. Unfortunately, the amount of money being paid by household consumers does not cover electricity production cost plus revenues. Construction of Sangtuda HPP-1 started in 2006. Iran's share in the construction accounted for US\$180 million, while Tajikistan covered only US\$40 million. According to the agreement, Iran would return the investment with interest from the HPP in 12.5 years of operation.⁴¹ Because the domestic market fails to pay expected price (the cost of electricity production only varies from 3–8 cents per kWh), the Tajik government had to redirect produced electricity to external markets. If Tajikistan signs up for currently offered terms of investment, the Rogun HPP will most likely face the same fate.⁴² Central Asian countries' selection of projects is often dependent on money they are given. External players are taking full advantage of instability in Central Asia to force regional state actors to accept terms that they would not under other circumstances.⁴³

⁴¹ "Vse GES Vaxshskogo Kaskada Snizili Proizvodstvo Elektroenergii na 30-40% (All HPPs on the Vaksh Cascade Decreased Power Production to 30-40%)," *Regnum*, December 3, 2013, accessed March 15, 2014, <http://www.regnum.ru/news/1740123.html#ixzz2vRvfDnNU>.

⁴² Olimov, "Personal Interview."

⁴³ Maxim Ryabkov, Personal Interview, Director of the OSCE Academy, Bishkek, Kyrgyzstan, September 5, 2013.

Lack of Trust

In the short- to medium-term perspective, only import of natural gas, oil products, and thermal electricity in wintertime from downstream countries can ensure energy security and create favourable investment climate for business to operate all year round in Tajikistan and Kyrgyzstan. While Rogun may turn Tajikistan into a major electricity exporting-country, intraregional trade of electricity and energy resources can significantly contribute to energy-led economic development and improve energy security. Construction of large HPPs in combination with increasing intra-Central Asian energy trade would be an ideal option to ensure security of the CAES. These two conditions are not mutually exclusive, if Central Asian governments coordinate their energy policies.

The biggest challenge, as it seems right now, is trust: Tajikistan does not trust Uzbekistan that it will not unilaterally cut energy supplies, and Uzbekistan has little confidence that Tajikistan will not keep more water than is allocated to it according to the agreements on Aral basin water withdrawal quotas. The paradox of water-energy nexus cooperation in the region is the fact that the best way to ensure uninterrupted water flow to downstream countries in the summer is to purchase electricity generated by releasing water from reservoirs in Tajikistan and Kyrgyzstan. Farkhod Tolipov, an expert on security issues in Central Asia, considered the counterfactual: what if Tajikistan had not obtained autonomy in 1929 and instead remained part of Uzbekistan? How would natural gas trading arrangements take place now and what would be the government's position on the Rogun dam? His answer is that Tajik people would probably have received gas for a subsidized price and that the government of Uzbekistan would have supported the construction of large HPPs in Tajikistan in order to both improve energy security

and increase electricity export capacity.⁴⁴ Intergovernmental agreements between Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan on using water-energy resources of the Syr Darya and Amu Darya basins require a multilateral format of negotiations on exchanging water, electricity and energy resources. However, starting from 2008, Uzbekistan only signs bilateral agreements⁴⁵ and avoids multilateral negotiations on large HPPs.

Several factors indicate that Uzbekistan might reconsider its position regarding cooperation with upstream states in the energy sector. First, the level of energy security in Uzbekistan will continue to worsen, thus leaving it no choice but to look for the most efficient way of using available energy resources. Second, Uzbekistan has almost no leverage left to force Tajikistan to give up the idea of building Rogun except to use the threat of military intervention. While the threat itself may have an impact, acknowledgement that none of the regional states want to destabilize the region decreases the potential effect of such threats. Some experts believe that there is a threat of large-scale destabilization of the region from outside, but it is less likely that the main reason would be the competition for Central Asian energy or water resources. Third, these countries are currently engaged in lose-lose relationships. Uzbekistan is pursuing a policy to promote its interests by affecting Central Asian upstream countries' foreign (energy) policies. Tajikistan is pursuing "survival" oriented energy policies to get out of the energy crisis. However, neither Uzbekistan nor Tajikistan is achieving their primary goal.⁴⁶

⁴⁴ Farkhod Tolipov, Director of Bylim Karvoni Non-Governmental Research and Training Center, Personal Interview, Tashkent, Uzbekistan, June 29, 2013.

⁴⁵ "Kirgiziya Virazila Sojalenie, Chto Uzbekistan ne Jelaet Sotrudnicat v Voprosax Stroitelstva GES (Kyrgyzstan Regrets that Uzbekistan is not Willing to Cooperate in Building HPP)," *Regnum*, February 5, 2013, accessed June 10, 2014, <http://www.regnum.ru/news/1621466.html#ixzz2vXzxCrn>.

⁴⁶ Tolipov, "Personal Interview."

Concluding Remarks

The security of the CAES is the condition in which all Central Asian states enjoy sufficient and sustainable energy supplies for both population and economic needs simultaneously. And there are several factors affecting the stability and reliability of energy supplies within the CAES, such as natural gas trade deals, which are usually signed on a long-term basis with long term obligations; pipelines, the only cost-efficient way to transport natural gas, and which require significant investments from both producers and customers; and the fact that Central Asia is surrounded by larger powers that often compete for energy resources.

Due to asymmetrical power relations within the CAES, larger powers attempt to maintain their influence over energy policy choices, and weaker powers are constantly searching for ways to increase their leverage. Central Asian exporters' dependence on the Russian pipeline network to export their natural gas put them in a vulnerable position vis-à-vis Russia. Russia effectively used this dependence to promote its economic and political interests. However, the Russian monopoly was challenged by the Chinese energy pipeline network. While it constitutes partially successful efforts to diversify away from Russia, diversification of export routes has minimal direct contribution to the level of energy security of the Central Asian states.

Taking into account the fact that there has been no natural gas production boom in Central Asia; there is doubt that regional producers will be able to produce necessary amounts of gas to keep up with international energy demand. An attempt to fulfill obligations to supply an agreed volume of natural gas to external customers may worsen unstable regional energy market in which less gas is available for Central Asian consumer countries. Having experienced a shortage of gas and electricity, especially during winter period, Tajikistan and Kyrgyzstan are trying to develop their hydro-power potential, which is further escalating tensions between

Central Asian countries over the energy-water balance. Uzbekistan uses the dependence of Tajikistan and Kyrgyzstan on Uzbek gas as a leverage to block the construction of giant HPPs.

To address the problem of energy deficiency in Central Asian upstream countries as a consequence of the CAES ongoing disintegration, these countries switched a water mode of the HPPs into an energy mode. However, without proper coordination, the energy-operating mode of the large HPPs may affect water distribution quotas in the region. Increasing the level of electricity production is expected to solve the problem of insufficiency and so the governments of these countries have prioritized construction of another set of large and medium HPPs. However, the analysis shows that projects, over which Central Asian upstream and downstream countries have serious disagreements, such as Rogun and Kambarata-1, have a number of limitations that will most likely impact the extent of their contribution to the security of the CAES. And, it is the cooperation in the energy sector and the reinstated gas and electricity trade within the region that can considerably improve CAES's security.

CHAPTER IV. Security of the Central Asian Energy System through Energy Trade

Establishing and operating independent energy systems, within the inherited interconnected network, that Central Asian states are currently prioritizing bears high cost and negatively impacts the security of the CAES. In contrast, reintegration of the CAES will not only restore the energy trade, but also provide a favourable investment climate for the modernization of existing facilities and construction of new infrastructures (HPPs, TPP, pipelines and electricity transmission lines). So the energy security interests of all Central Asian countries are met simultaneously within the integrated CAES. However, Central Asian oil and gas producers believe the interdependence that the CAES entails threatens their sovereignty and national security. Moreover, the revenues from exporting energy to external markets are so great that the elites who control the energy flow would refrain from full-scale reintegration of energy sectors since it will limit governments' control over their energy resources.

But the analysis shows that reinstating the energy trade to meet current demand while the state retains full control over its energy sector is not only possible, but also is a necessary condition in the short-term perspective. In the short-term, the intraregional energy trade implies that Central Asian countries would only assist each other to meet insufficient energy resources, which would otherwise be impossible to obtain or at least cost inefficient, especially during energy demand peaks. While such trading arrangements contribute to the level of energy security in the short run and do not guarantee sustainability of supplies in the long-term perspective, restoring the energy trade is nonetheless an important first step toward breaking the status quo and achieving a maximally secure CAES. Increasing the intra- Central Asian energy trade, however, will be possible only under the condition that state actors, to some extent, reconsider their policy priorities.

Table 20: Attributes of a Maximally Secure CAES: Development Scenarios

<i>Criteria</i>	<i>Energy sector development scenarios</i>		
	<i>1</i>	<i>2</i>	<i>3</i>
	Status Quo (Energy Insecurity)	Energy trade to meet current demand (Short-term Security of Energy Supplies)	Integrated Central Asian Energy System (Sustainable and Long-term Energy Security)
Security of Energy Supplies (Diversification of energy by source, fuel type, transport routes and electricity production by fuel type; Strategic reserves and refining capacity; market mechanisms)	Prospects: -Independent energy systems are less vulnerable to unilateral energy supply cuts Challenges: -National energy systems are not designed to operate independently (very limited storage and processing capacity); -Excessive dependence on fossil fuels in downstream countries and lack of these resources in upstream countries; -Reliance on non-market mechanisms.	Prospects: -Diversification of electricity generation by fuel type and energy sources in the overall balance; -Prevents water spills from existing infrastructure without producing electricity; -Secures necessary amount of energy for the regional use; Challenges: -Energy transportation loss—due to inability to agree who is responsible for the maintenance of transport infrastructure; -Continue to pursue establishing independent energy systems.	Prospects: -Stable and reliable supplies of diversified energy sources; -Share the cost of energy projects (money, personnel, available technology); - Does not require huge investments in new infrastructures (only in upgrading existing ones); -States are encouraged to use market mechanisms; - Enhanced reliability, flexibility and quality of energy supply.
Energy demand management Expose to demand side risks (fossil fuel demand reduction; expose to demand surges; balanced distribution of resources)	Challenges: -Policy initiatives encourage increasing fossil fuel consumption; -Unable to meet peak demands in response to extreme weather conditions; -Increasing export at the expense of domestic consumption.	Prospects: -Fossil fuel demand reduction (for Uzbekistan and Kazakhstan) due to exchange of energy resources; -With proper coordination—ability to meet energy demand peaks; Challenges: -Energy export still prevails over domestic consumption needs.	Prospects: -Fossil fuel demand reduction as a result of policy initiative; -Ability to meet energy needs for the periods of demand peak; -No export at the expense of domestic consumption; -Balanced amount of export and import.

<i>Criteria</i>	<i>Energy sector development scenarios</i>		
	<i>1</i>	<i>2</i>	<i>3</i>
	Status Quo (Energy Insecurity)	Energy trade to meet current demand (Short-term Security of Energy Supplies)	Integrated Central Asian Energy System (Sustainable and Long-term Energy Security)
Energy Efficiency Energy consumption growth/economic growth (Burning fossil fuels produce electricity and is used for heating in winter; avoiding HPP water spills)	Challenges: -Shortage of energy production in winter in Upstream states; -Water spills in summer; -Inefficient use of fossil fuels.	Prospects: -Availability of energy for Upstream states in winter -Businesses operate all year round; Challenges: -Subsidizing inefficient energy sector remains; -No mechanism to ensure reliability and stability of energy supplies.	Prospects: -Guaranteed and long-term availability of energy for both Upstream and Downstream countries to work all year round by using hydro-power and fossil fuels in the most efficient way.
Economic aspect (Total fuel costs/GDP; Import fuel cost/GDP; Fuel import—% of GDP)	Challenges: -Increasing total fuel production cost leads to higher subsidies in energy sector to avoid social tensions and political instability; -Increasing import of oil and gas products from outside the region for higher cost; -Building independent energy systems (electric power transmission lines and pipelines) increases the cost of energy.	Prospects: -Decreasing the total fuel price; - Increasing import from the regional producers for lower prices; -Producing energy in a more cost efficient way (hydro power in the summer; thermal power in winter); Challenges: -Energy sector remains highly subsidized.	Prospects: -Sustainability of the most economically efficient production of energy resources; -Stable pricing policies; -Limited exposure to energy related economic risks; -Savings in operating and investment costs.
Environmental aspect (Greenhouse gas emissions)	Prospects: -Slowly developing RES; Challenges: -For Downstream states, increasing fossil fuels consumption to cover the loss of electricity previously imported from Upstream states; -For Upstream states investment in the development of its fossil fuel deposits.	Prospects: -More balanced consumption of fossil fuels due to periodical exchange of cleaner energy sources; -Sharing the knowledge of RES development; Challenges: -For Upstream countries limited increase of their own consumption of fossil fuels; - For Downstream countries slowly raising the stake of fossil fuels in the overall energy balance.	Prospects: -Efficient use of natural gas (cleaner than oil and coal) and hydro power due to exchange of energy resources, contributes to long-term sustainability of the regional ecosystem.

<i>Criteria</i>	<i>Energy sector development scenarios</i>		
	<i>1</i>	<i>2</i>	<i>3</i>
	Status Quo (Energy Insecurity)	Energy trade to meet current demand (Short-term Security of Energy Supplies)	Integrated Central Asian Energy System (Sustainable and Long-term Energy Security)
Human Dimension (Increase the fraction of population with access to basic energy services)	Challenges: -Supply of energy to population spots that are already connected to energy system is limited due to state's inability to meet domestic needs; -Energy supply shortage due to isolation from the CAES; -Increasing export at the expense of domestic consumption.	Prospects: -Availability of additional energy to meet peak demands; -Incentive to wider introduce RES technology in remote areas; Challenges: -Availability of energy is too dependent on ups and downs of negotiation processes; -Increasing export at the expense of domestic consumption remains.	Prospects: -Maintenance of the interconnected energy transporting system allows providing sufficient and clean energy to the people that now lack energy due to withdrawal of some of the members of the CAES; -Ensures slow but gradual transition to a more sustainable energy sector.
Military/Security Dimension (Non-traditional threats; conflict over resources)	Challenges: -Exposure to military conflict over Rogun and Kambarata-1 HPPs; -Inability to take coordinated actions against non-traditional threats (terroristic attacks); -Using energy weapon (influence the decision making of other countries).	Prospects: -Provide security of energy supply and transit within the region; -Governments' can secure necessary amount of energy to meet basic needs in the period of energy crisis to avoid social uprising and political confrontation; Challenges: -Risk of military confrontation remains; -Inability to respond to non-traditional security threats; -States are not secure from energy weapon.	Prospects: -Low risk of conflict over resources among Central Asian countries; -Interconnected states are interested in fighting back security/military groups threatening security of energy supplies within the region; Challenges: -Some external state actors may perceive such union as a threat.
Regional Cooperation (Commitment to regional cooperation on energy related issues)	Prospects: -Multilateral Inst. provide support (grants) to Tajikistan and Kyrgyzstan to improve energy security; Challenges: -Frequent energy supply cuts due to lack of an effective enforcement mechanism; -Image of an unreliable partner.	Prospects: -Short-term and bilateral contracts for the functioning of the CAES is better than the disintegrated system; Challenges: -No effective and trustworthy mechanism regulating regional cooperation.	Prospects: -Long-term and multilateral agreements in energy sector; -Effective mechanism (The Energy Security Center for Regional Cooperation) to timely and efficiently respond to energy security threats.

Along the Way Toward Independent Energy Systems (Status Quo)

The status quo is characterized by the recently emerged energy insecurities due to Central Asian countries' desire and in some cases necessity to establish independent energy systems. Currently, each Central Asian government pursues policies designed to establish and strengthen their national energy systems. While decreasing dependence on imported oil, gas and electricity may potentially improve a country's ability to resist unilateral sudden energy supply disruptions, disintegration process of the CAES has negatively impacted the level of the energy trade. It became obvious that energy trade disruptions without establishing self-sustaining independent energy systems affect energy security of all Central Asian states to different extents.

Guided partially by the belief of self-sufficiency, Uzbekistan decided to withdraw from the CAPS and redirect gas and electricity exports to external markets. Due to its strategic location on the crossroad of energy-transporting corridors within the region, this decision affected the overall security of the CAES. Energy supply cuts, in combination with highly subsidized and inefficient energy sectors, underdevelopment of RES, lack of countrywide electricity transmission and gas supply networks, as well as disagreements over the water withdrawal balance have severely affected availability and affordability of energy supplies to Central Asian upstream countries and sustainability and efficiency to downstream states.

Independent energy systems do provide higher security from sudden unilateral supply cuts, but also bear additional costs and can only be realized in the long-term. Establishing and sustaining independent energy systems in Central Asia would require at least:

- (a) Construction of new gas-fired TPPs in Turkmenistan and an extension the gas and electric power supply networks;

- (b) In Kazakhstan, an enlargement of the 500 kV transmission lines connecting north with south, and construction of the Beineu–Bozoy–Shymkent pipeline to transport natural gas from the gas-rich regions to southern parts of Kazakhstan and Tobol–Kokshetau–Astana pipeline;
- (c) In Uzbekistan, the construction of new small HPPs and coal/gas-fired TPPs;
- (d) In Tajikistan, establishing countrywide electric power transmission lines, including “North–South” and construction of the Rogun HPP;
- (e) In Kyrgyzstan, completing the 500 kV “Datka–Kemin” north-south and other smaller transmission lines as well as building Kambarata–1 HPP as well as Kara–Keche TPP; and
- (f) Most importantly, introduce energy efficiency technologies in outdated energy producing, transporting and consuming facilities.

Central Asian countries may strengthen their national energy systems at some point, but the transition will be accompanied by a decrease in energy security in some countries, an unfavourable investment climate to promote energy-led economic growth and underdevelopment of some energy sectors in others.¹

Integrated Central Asian Energy System

As highlighted in the previous section establishing and operating independent energy systems within still interconnected networks bears high cost and negatively impacts the level of energy security in Central Asia in the transition period. From the energy security perspective, re-integration of the CAES would be the most promising way to address energy security challenges

¹ Central Asian countries’ energy insecurities are discussed in detail in Chapter II.

in the region. Coordinated operation of the CAES and rationally exploiting energy potential of the region would ensure stability and reliability of supplies prioritizing energy trade/resource exchange within the region. It will also ensure the sustainability of energy sectors providing sufficient and clean energy for population and economic needs for the foreseeable future. Most importantly, the CAES will serve as an effective mechanism capable of ensuring energy security in the long-term perspective. Long-term stability and reliability of energy supplies as well as the resolution of disagreements over the construction of large HPPs in Central Asia will improve investment climate for the private sector to participate in energy projects and accelerate energy-led economic growth. Market mechanisms prevailing within the CAES may contribute to solving the problem of highly inefficient and subsidized energy sectors and promote alternative energy sources in the region.

While energy interests of all countries are met simultaneously within the integrated CAES, Central Asian states perceive interdependence as a factor threatening national security and would refrain from full-scale reintegration of their energy sectors. Lack of political will is considered a major obstacle toward restoring CAES.² Central Asian countries' energy security policies are currently state-centric, export-focused and short-term oriented. Having perceived energy resources as a strategic commodity, state actors try to maintain full control over production, distribution, and transportation of these resources. The large revenues that Central Asian governments stand to earn from selling their resources, encourage these governments to increase export capacity to external markets even at the expense of domestic and intraregional energy consumption. Short-term oriented energy policies also impact the sustainability of the Central Asian energy sectors. Asymmetrical interdependence between regional producers and

² Tolganai Umbetaliyeva, Personal Interview, Director of the Central Asian Foundation for the Development of Democracy, Almaty, Kazakhstan, April 1, 2014.

external customers who are eager to acquire Central Asian resources but who also prefer a bilateral format of cooperation remains a challenge to establish a strong unified energy system (CAES).

Reintegration of the CAES varies from simply maintaining the coordinated operation of energy networks to large-scale joint investments in the development of hydrocarbon and hydro-power sectors. Due to different levels of economic development, Central Asian countries will not be able to equally contribute to sustaining the system and share the cost. Kazakhstan's GDP accounts for twofold that of other Central Asian states' combined, while economies of Tajikistan and Kyrgyzstan are the least developed.³ Unwillingness of some regional state actors to take over the cost of others while equally sharing the benefits is another challenge indicating that full-scale reintegration of the CAES at this stage is highly unlikely.

Intra-Central Asian Energy Trade to Meet Current Demand

Restoring energy trade may either lead to an integrated energy system or provide conditions for a smooth transition to independent energy systems depending on which policy priority is chosen by the Central Asian governments. Intra-Central Asian energy trade ensures sufficient energy supplies to meet energy demand peaks for Central Asian upstream countries and allows downstream neighbours to use their resources more efficiently. It might only contribute to energy security level of the Central Asian region in the short run, but it may nonetheless be an important first step toward achieving a maximally secure CAES in the future. Breaking the status quo through intra-regional energy trade, which is beneficial for both sides, should be an important policy direction for the Central Asian countries if they want to improve

³ World Bank, *GDP (Current US\$) for 2013* (Washington, DC: World Bank, 2015), accessed March 1, 2015, <http://data.worldbank.org/indicator/NY.GDP.MKTP.CD/countries/XD-XM?display=default>.

their energy security. In fact, Central Asian countries would achieve similar benefits from intra-regional energy trade as from operating within the reintegrated CAES. Short-term bilateral agreements-based energy trade within the region, however, is not sustainable. Unless there is a well-functioning regional energy governance mechanism designed to ensure cooperation in energy sector to improve energy security in emergency as well in normal situations the CAES will remain vulnerable. At the same time, while increasing intra-Central Asian energy trade requires to some extent reconsideration of the state actors' energy policy priorities, issues of sovereignty, strategic interests and distribution of gains are not as acute as in case of the CAES reintegration and thus, more acceptable to Central Asian governments.

The analysis of the vulnerability of the CAES shows that there are several advantages of intra-Central Asian energy cooperation with direct effect on the level of energy security in the region. Regional state actors have inherited gas pipeline and electric power grid networks so that there is no need to invest in expensive infrastructure to connect Central Asian energy sectors. Comparative advantage in complementary energy sources provides the conditions for using energy in the most rational way by exchanging or trading resources. Since the volume of electricity and natural gas export/import in the region is insignificant, such trading arrangements do not threaten the availability of energy to external customers and thus do not cause confrontation from their side. The Central Asian energy trade does not only address the problem of the uneven distribution of resources, but also resolves the shortage of energy due to seasonal variations. The most cost-efficient way to produce energy and transport it within the region will decrease the price of energy. While re-integration of the CAES in the current geopolitical realities would be a difficult task to accomplish, coordinated management of energy supply flows and increasing energy trade among regional state actors are quite realizable. Trading of energy

resources may go beyond formal trading agreements and take the form of swaps, barter and other types of exchange arrangements. It is important, however, that such arrangements are concluded mainly among Central Asian countries because all external actors are only interested in moving resources out of the region with no contribution to Central Asian energy security.

Table 21: Direct Energy Interests with the CAES and over Central Asian Energy Resources

	From Kazakhstan	From Kyrgyzstan	From Tajikistan	From Turkmenistan	From Uzbekistan
Kazakhstan	=/=	-Imports electricity; -EEU membership – free movement of energy resources	-Potential to import electricity in summer	-Shares energy interests of major exporting countries in Central Asia; -Common position regarding the Caspian Sea oil and gas exploration	-Imports natural gas (4 billion m ³ per year) for the needs of its Southern and South-eastern regions; -Imports electricity to supply its Southern regions
Kyrgyzstan	-Imports electricity (1,5 billion kWh per year); -Imports natural gas, light oil products, coal; -Potential investor in energy projects	=/=	-Partners within the CASA–1000; -Transit states for the CAGP Line–D	-Potential importer of natural gas and electricity	-Imports natural gas–280 million m ³ per year; -Imports electricity in winter; -Imports coal
Tajikistan	-Imports light oil products in insignificant volumes	-Imports light oil products; -Shares common position in relations with downstream Uzbekistan over the water-energy nexus	=/=	-Potential importer of natural gas; -Potential to import electricity in winter	-Imports natural gas (currently stopped); -Imports electricity in winter (currently stopped); Imports oil products (currently

	From Kazakhstan	From Kyrgyzstan	From Tajikistan	From Turkmenistan	From Uzbekistan
					stopped); -Conflicts over Rogun dam/HPP
Turkmenistan	-Major transit country for Turkmen gas on both Russian and Chinese directions	- Transit (potentially importing) country for Turkmen gas via CAGP Line-D	-Transit (potentially importing) country for Turkmen gas via CAGP Line-D	=/=	-Major transit country for Turkmen gas to Russia and China; -Transit country for Turkmen gas and electricity to Tajikistan
Uzbekistan	-Shared interests in dispute against the construction of giant HPPs and redistribution of water withdrawal	-Imports hydroelectricity (currently stopped) along with stable water release	-Imports hydroelectricity (currently stopped) along with stable water release	-Potentially importing electricity and natural gas	=/=
Russia	-Imports/ exports of electricity; -Exports light oil products to Kazakhstan; -Imports and transits of oil; -Imports Kazakh uranium	-Modernization and development of gas and hydro-power sector (Kyrgyzgaz; Bishkek TPP; Kambarata-1) -Mediator to assure Uzbek gas and thermal power supply	-Hydro-power sector development; -Operation of HPPs, including Sangtuda-1 HPP; -Potential contributor to the construction of Rogun HPP	-Imports and a transit country for Turkmen natural gas	-Imports Uzbek gas; -Imports Uzbek Uranium
China	-Imports oil and natural gas; -Imports uranium	-Transit country for the CAGP; -Interested in importing electricity	-Transit country for the CAGP; -Interested in importing electricity	-Main importer of Turkmen gas (up to 65 billion m ³ per year)	-Imports natural gas (10 billion m ³ per year)
European Union	-Major importer of Kazakh oil;	=/=	=/=	-Interested in importing Turkmen gas;	=/=
Afghanistan	=/=	-Interested in importing electricity via CASA-1000	-Imports electricity	-Interested in importing gas and electricity	-Imports electricity
Iran	-Swap oil deals with Kazakhstan	=/=	=/=	-Imports Turkmen gas; -Swap oil deals	=/=

Complementarity of Energy Resources

Central Asian countries do not only possess a significant amount of resources, but also enjoy a comparative advantage in developing different types of energy, which provides incentive for intra-regional trade (Tajikistan and Kyrgyzstan enjoy 5.5 percent of the world's economically-efficient hydro-power potential; Kazakhstan possesses a considerable amount of oil and is among the top ten countries with explored coal reserves in the world; Uzbekistan is a major natural gas producer in the region; Turkmenistan is the largest natural gas exporter in Central Asia and ranks fourth in terms of gas deposits in the world).⁴ While diversification of sources in the energy consumption balance is often tied to RES, in the context of the Central Asian region it is the exchange of fossil fuels and hydro power, which can provide sustainability of supplies in the short to medium run. Having benefitted from exchanging different types of resources, Central Asian states enjoyed stability and reliability of energy supplies for many decades. However, the disintegration process of the CAES has forced state actors to develop and depend on a particular type of energy source and thus, have become vulnerable. Intra-Central Asian energy trade can work to solve these problems by contributing to the diversification of energy sources in the overall balance of energy consumption.

Sufficiency of the Supplies

Kyrgyzstan and Tajikistan import a high volume of primary energy resources and have limited opportunities to diversify their dependence on existing electricity transmission lines and

⁴ R. A. Zakhidov, "Central Asian Countries Energy System and Role of Renewable Energy Sources," *Applied Solar Energy* 44, no. 3 (2008): 218–223.

gas supply networks coming from and through Uzbekistan. While Central Asian downstream countries' oil and natural gas are important for external players, they are also extremely important for Tajikistan and Kyrgyzstan.⁵

Hydro power is the main source of energy for these countries. However, water run-of-river type HPPs produce electricity only in the summer period, leaving countries in an energy crisis in the winter. Having quite a few diversification options, Tajikistan and Kyrgyzstan may hope to receive Kazakhstani fossil fuels and thermal electricity. Another possibility is to use transited Turkmen gas through Tajikistan and Kyrgyzstan when CAGP's Line-D is constructed and thermal electricity from Turkmenistan. In any case, Central Asian producers themselves can supply an additional volume of energy to upstream states. In addition, using existing infrastructure remains the most cost efficient way to improve energy security in upstream Central Asian states.

Sustainability of Energy Supplies

Overemphasizing the importance of fossil fuels explains the lack of attention by governmental agencies toward the development of RES to ensure sustainability of energy supplies. Despite the fact that Central Asian countries enjoy an abundance of clean energy resources (5.5 percent of the world's economically efficient hydro-power potential is found in Tajikistan and Kyrgyzstan and solar energy in mainly downstream states is available an average of 8–10 hours of sunshine per day),⁶ they represent only a tiny proportion of the resources used to produce electricity. Renewables, mainly hydro power, accounted for only 1 percent of Kazakhstan's, 2 percent of Uzbekistan's, and 0.001 percent of Turkmenistan's primary energy

⁵ Maxim Ryabkov, Personal Interview, Director of the OSCE Academy, Bishkek, Kyrgyzstan, September 5, 2013.

⁶ Zakhidov, "Central Asian Countries Energy System," 218–223.

production.⁷ When Uzbekistan withdrew from the CAPS it succeeded to cover electricity loss that was previously imported from upstream countries by burning more coal and gas in TPPs. Turkmenistan increased the number of gas-fired TPPs to meet its electricity needs. Kazakhstan connected its southern regions with electricity produced in coal-fired TPPs located in the north. Apart from environmental considerations producing electricity in TPPs during summer period is cost inefficient. In winter, TPPs produce electricity and provide a heating opportunity, while in summer only electricity is produced.

Burning fossil fuels are the source of CO₂ emissions. Figures for carbon dioxide emissions from the consumption of energy for Central Asian countries in tonnes per capita suggest that the level of CO₂ in Central Asian downstream countries is quite high: Kazakhstan—11.3; Kyrgyzstan—1.4; Tajikistan—0.34; Turkmenistan—10.4; and Uzbekistan—4.1).⁸ While energy efficiency initiatives to improve energy-producing facilities can save some energy, it is not a solution per se. It can only buy time to develop a sustainable energy sector.⁹ Importing electricity from upstream Central Asian states, which have a surplus of clean and sustainable electricity production during the summer, would benefit downstream countries by providing the possibility to use their fossil fuels more efficiently with limited CO₂ emissions.

The water-energy nexus dispute between Uzbekistan and Central Asian consumer countries poses a serious challenge to the realization of the region's full hydro-power potential.

⁷ International Renewable Energy Agency, *Renewable Energy Country Profile—Kazakhstan* (Abu Dhabi: IRENA, n.d), accessed December 1, 2014, <http://www.irena.org/REmaps/countryprofiles/asia/Kazakhstan.pdf>; International Renewable Energy Agency, *Renewable Energy Country Profile—Turkmenistan* (Abu Dhabi: IRENA, n.d), accessed December 1, 2014, <http://www.irena.org/REmaps/countryprofiles/asia/Turkmenistan.pdf>; International Renewable Energy Agency, *Renewable Energy Country Profile—Uzbekistan* (Abu Dhabi: IRENA, n.d), accessed December 5, 2014, <http://www.irena.org/REmaps/countryprofiles/asia/Uzbekistan.pdf>.

⁸ US EIA, Statistics: Per Capita Carbon Dioxide Emissions from the Consumption of Energy for 2011 (Metric Tons of Carbon Dioxide per Person) (Washington, DC: US EIA, n.d., accessed January 4, 2015, <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=90&pid=45&aid=8&cid=KZ,KG,TI,TX,UZ,&syid=2007&eyid=2011&unit=MMTCD>.

⁹ José Goldemberg, “Energy Choices toward a Sustainable Future,” *Environment: Science and Policy for Sustainable Development*, December 2007, accessed February 5, 2015, <http://www.environmentmagazine.org/Archives/Back%20Issues/December%202007/Goldemberg-full.html>.

While approximately 98 percent of Tajikistan's electricity is produced using hydro power, only 10 percent of its total hydro-power potential is currently being tapped.¹⁰ Further development of the region's hydro-power potential (i.e., the construction of the Kambarata–1 and Rogun HPPs) will enable a surplus of electricity for internal consumption, which will most likely result in increasing the volume of clean electricity exports to neighbouring downstream countries as well as external customers.¹¹ A surplus of electricity will not entirely replace gas and fuel imports, but it will allow Tajikistan and Kyrgyzstan to engage in energy trade negotiations with Uzbekistan on a more equal footing.

Inherited Energy Transport Infrastructure

Building infrastructure to connect energy-producing and consuming sites is probably the most time-, energy- and finance-intensive part of establishing an energy system. Central Asian countries have inherited energy infrastructure (for example, Bukhara–Tashkent–Shymkent–Almaty–Bishkek, Uzbekistan–Tajikistan, Uzbekistan–Southern Kyrgyzstan gas pipelines and the Central Asian electric power grids) capable of transporting enough resources to meet current energy needs of the whole region. Increasing energy supplies through upgrading existing infrastructure is cheaper and faster than building independent energy systems. In this sense, interconnected energy systems entail two key economic benefits: savings in operating costs of the interconnected electric power and pipeline systems; and savings in investment costs of upgrading interconnected energy infrastructure networks.

¹⁰ Robert L. Wilby et al., *PPCR Phase I Project A4: Improving the Climate Resilience of Tajikistan's Hydropower Sector* (Pilot Program of Climate Resilience, 2011), accessed January 5, 2014, [http://www.ppcr.tj/IP/Phase1/Component4/ppcr_a4_-draft_final_report_13oct11%20\(Final%20REport\).pdf](http://www.ppcr.tj/IP/Phase1/Component4/ppcr_a4_-draft_final_report_13oct11%20(Final%20REport).pdf).

¹¹ Igor Tomberg, "Energy Industry in Central Asia—Challenges and Prospects," *Russian International Affairs Council*, 2012, accessed March 4, 2013, http://russiancouncil.ru/en/inner/?id_4=350#top.

Alternative Electric Power Transmission Lines

An attempt to establish an independent electric power system while avoiding the electricity transmission lines of Uzbekistan is still in the planning stage. Once Kazakhstan, Kyrgyzstan and Tajikistan complete the construction of their independent electric power grids connecting north with south, there will be a possibility to connect south-eastern Kazakhstan with northern Kyrgyzstan via the Kemin–Alma 500 kV transmission line and southern Kyrgyzstan with northern Tajikistan via the Datka–Hodzent 500 kV transmission line.¹² Alternative electric power systems would then allow these three countries to exchange electricity to meet seasonal production deficiencies. Establishing a well-functioning countrywide electric power transmission networks and connecting all three countries by building trans-border transmission lines are both time- and finance-intensive projects. This may seem to be a good option in the long-term, but in the short-term, the increasing electricity trade within the existing Central Asian electric power grids that will make it possible to address more acute energy security challenges.

Decreasing the Price of Energy

In one of his speeches, President of Kazakhstan Nursultan Nazarbaev highlighted, “the price of electricity will continue to increase, whether you want it or not; the price of gas will be getting close to world prices as well; [so he recommends that industries and people] employ energy efficient technologies.”¹³ Turkmenistan has introduced pricing for natural gas that was previously provided free of charge. It has also become difficult for Uzbekistan to sustain low

¹² Asian Development Bank, Technical Assistance Consultant, *Central Asia Regional Economic Cooperation: Power Sector Regional Master Plan* (Metro Manila: Asian Development Bank, Report no. 43549, 2012), 2–34, accessed January 15, 2015, <http://adb.org/sites/default/files/projdocs/2010/43549-01-reg-tar.pdf>.

¹³ Murat Jakeev, “Tarifi na Elektroenergiyu i Gaz Budut Rasti—Prezident RK (Tariffs for Electricity and Gas will Continue to Increase—President of RK),” *Kazinform*, July 2, 2014, accessed August 1, 2014, <http://inform.kz/rus/article/2674096>.

prices of gas, electricity and oil products in its highly subsidized energy sector. Total subsidy as shares of GDP in Uzbekistan accounts for 21.7 percent, followed by Turkmenistan with 20.6 percent and Kazakhstan with 2.8 percent.¹⁴ Tajikistan and Kyrgyzstan suffer from high prices for energy. These countries are in need of cheaper energy, which can be provided by choosing the most cost efficient way to secure supply of energy resources. Even though quick transition to equating domestic and foreign prices is difficult, this process in the end is inevitable. Taking into account economic, environmental and energy security concerns of using independent energy systems, regional energy trade will decrease the cost of energy, thus accelerate the transition process.

Preventing Conflict over the Region's Resources

Guided by the belief of self-sufficiency, Uzbekistan has cut gas and electricity supply to upstream Central Asian states, and in response Tajikistan and Kyrgyzstan are speeding up the process of Rogun and Kambarata–1 HPPs construction. Projects capable of affecting the existing water distribution level in the region have led to confrontation from downstream Central Asian countries. During an official visit of the President of Uzbekistan to Kazakhstan, he warned that construction of large HPPs in the region may “lead not only to confrontations, but also to war.”¹⁵ Restoring and sustaining regional energy trade would be a gesture of good will from the Uzbekistani side and encourage upstream states to sustain previous water-energy supply balance until Central Asian countries can reach solutions amenable to all.

¹⁴ International Energy Agency, *Fossil Fuel Consumption Subsidy Rates as a Proportion of the Full Cost of Supply, 2013* (Paris: International Energy Agency, n.d), accessed June 15, 2015, <http://www.iea.org/subsidy/index.html>.

¹⁵ Fuel Energy Sector Transparency Initiative in Kyrgyz Republic, “Kambaratinskie Strasti (Kambarata Passion),” *Energoforum*, December 10, 2012, accessed June 5, 2014, http://www.energoforum.kg/index.php?act=view_material&id=374.

Concluding Remarks

Regional producers' perception of energy resources as a strategic commodity and the overemphasized sovereignty issues have prevented a full-scale re-integration of the Central Asian energy sectors. Transition to independent national energy systems, however, along with developing countrywide infrastructure and increasing energy production capacity also requires sustaining intra-Central Asian energy trade. Short-term trading arrangements will not solve all energy security problems, but they can contribute to enduring affordable prices by using resources rationally, enhancing countries' ability to meet energy peak demands and creating preconditions to establish sustainable energy sectors. Since energy sectors are highly controlled by the governments, improving intra-regional trade requires particular state policies that prioritize intra-Central Asian energy cooperation and trade. What is needed to achieve this goal is to have a platform where regional governments and non-state institutions could coordinate their course of actions to strengthen regional cooperation in the energy sector.

In order to restore intra-Central Asian energy trade, regional state actors' energy policies should be designed in such a way that increasing the energy export does not compromise the availability of sufficient energy supplies for regional consumption. Subsidizing energy for the domestic market makes it economically inefficient for regional producers to increase the volume of energy for internal and intra-regional markets. Moreover, to compensate for economic loss due to subsidizing energy for domestic consumers, regional exporters are likely to continue prioritizing exports to external markets. In this sense, it is using resources in the most rational and cost efficient way that can incentivize regional actors to engage in cooperative dynamics in the energy sector.

Having a history of long-term cooperation in the energy sector with the preconditions to establish and sustain cooperative dynamics, the “SH” is a good model by which to map Central Asian countries’ energy security dilemma. There are prospects to hunt a stag (the security of the CAES) through cooperation in the energy sector and to reinstate intra-Central Asian energy trade. Existing energy infrastructure, history of the parallel operation of the national energy systems, complementarity of energy sources, among many other factors, may incentivize and encourage actors to pursue strengthening the security of the CAES. Central Asian actors can achieve the highest pay off through cooperation in the energy sector. Since there should be no incentives between actors to cheat on each other in pursuit of rewards higher than what they can achieve through cooperation, current regional-level energy security problems lie with actors’ failure to take coordinated actions to respond to those challenges and not the cooperation itself. The main challenge as it seems now is the choice between short- and long-term benefits. While all Central Asian countries will most likely benefit from cooperation in the energy sector, current geopolitical realities tempt some actors to defect on others and pursue short-term rewards (not necessarily in terms of energy security) and force others do the same, thus leaving them absolutely no chance to hunt the stag. To encourage energy actors to coordinate their strategies to address energy security challenges, several energy governance mechanisms (innovations) were put in place.

CHAPTER V. Regional Energy Governance Innovations in Central Asia

Political context has always been an integral part of the Soviet energy management. While the Communist Party and Executive Committee (Politburo) shaped the policy making in the energy sector, planning and administrative organizations, ministerial, regional and scientific groups also played an important role in formation of those policies.¹ Having designed electric power systems without regard to republic borders, the Soviets enjoyed the advantage of a nationwide Unified Power Systems. There were 11 such systems established within the Soviet Union.² Management of electric power systems on such a large territory requires effective control centres. Coordination and management of these systems was assigned to the central dispatching department (CDD). The primary responsibility of the CDD was to ensure stable and reliable supply of electric power to consumer sites as well as efficient operation of the unified electric power systems.³

There were two levels of decision making in the Soviet Union. First, the Politburo determined the main policy directions and energy strategy. Second, Gosplan (the state planning agency), in coordination with ministries and research institutions, elaborated detailed energy policies. There were over 60 ministries in the Soviet government, of which 11 were responsible for energy production and management and another 6 provided construction, transportation and infrastructure support.⁴ The energy industry was structured in the way that operated as a centrally planned system. It was characterized by horizontal relationships among various agencies (the oil ministry, the refining petro-chemicals ministry, the foreign trade ministry, etc.),

¹ Lionel S. Johns et al., *Technology and Soviet Energy Availability* (Washington: U.S. Government Printing, 1981), 355.

² Ibid., 156.

³ Ibid., 157.

⁴ Ibid., 356.

each of which had its own areas of jurisdiction.⁵ The key is that there had been a supranational body to establish energy sector development strategies and monitoring mechanisms. Regional energy systems, however, have undergone significant internal transformations since the early 1990s, shifting from horizontal to vertical management systems (widely used in Europe).⁶ Energy companies became responsible for extraction, exploitation and transportation of energy resources to energy markets. Most importantly, there was no longer a centre to oversee the coherent, efficient development of regional energy as a whole.

Having experienced energy insecurity due to decreasing intra-Central Asian cooperation in the energy sector, regional state actors are in need of reinstating energy trade and coordinated operation of energy systems. However, financial and technological limitations as well as political constraints affect Central Asian governments' capability and often willingness to address energy security problems through regional cooperation. As the analysis shows security of the CAES is determined by several conditions: reliability and stability of sufficient energy supplies both in normal and emergency situations; the ability to coordinate actions to quickly and effectively respond to sudden energy supply cuts; transparency and accountability of energy sectors; transit security of energy resources through the territories of the Central Asian states; at the country-level development of the RES and increasing energy efficiency of energy producing, consuming and transporting facilities. These conditions were largely provided by the CAES, which was controlled by Moscow during the Soviet period and operated by inertia afterwards. Ongoing disagreements between Central Asian countries leading to disintegration of the CAES can hardly be resolved or, what is more important, the CAES cannot be sustained without an effective regional energy governance mechanism. In the Central Asian context such a mechanism must

⁵ Daniel Yergin, *THE QUEST: Energy, Security, and the Remaking of the Modern World* (The Penguin Press, 2011), 27.

⁶ *Ibid.*, 28.

possess powerful instruments to encourage Central Asian states to fulfill their obligations to ensure stability of energy supplies within the region, in which sacrificing some of their interests due to integration of energy networks into a broader system would still be better than non-compliance with terms of intergovernmental agreements.

One of the key aspects of energy security in Central Asia is the ability of the regional actors to ensure joint investments in maintenance and modernization of transboundary electricity transmission lines, pipeline infrastructures as well as the development of the Central Asian (hydro) power and fossil fuel sectors by pulling financial resources, technologies and qualified expertise from multilateral-institutions, private companies, civil society organizations and national governments. It has been found that a governance innovation capable of guiding national energy policies along the lines of the Central Asian Regional Energy Cooperation Strategy and Action Plan (which mainly focuses on five Central Asian states) can be an asset to ensure sustainability of cooperative dynamics in the energy sector. Conceptually, achieving the above-mentioned goals depends on whether Central Asian energy governors share a common understanding regarding what constitutes the core of energy insecurity, the seriousness of energy security challenges and the importance of collective policy initiatives to overcome those obstacles.

Acknowledging the importance of regional energy cooperation and the above-mentioned attributes of a maximally secure CAES, several regional-level governance innovations were put in place to promote and strengthen it. International financial institutions, NGOs, private and state energy companies as well as research institutions have, to certain extents, successfully engaged in the development of the Central Asian energy sectors and provided security for the CAES through several regional energy programs and initiatives (governance innovations): the Asian

Development Bank (ADB) promoted the Central Asia Regional Economic Cooperation (CAREC); the World Bank supported the Central Asia Energy–Water Development Program (CAEWDP); Central Asia–South Asia Regional Electricity Trade Project (CASA–1000); Rogun Techno-Economic Assessment and Environmental and Social Impact Assessment Studies in Tajikistan as well as the European Union-supported Central Asian Regional Environmental Center.⁷ Besides, multilateral platforms there are also intergovernmental organizations such as the Shanghai Cooperation Organization (SCO), the Commonwealth of Independent States (CIS) and the Eurasian Economic Union (EEU), which have developed mechanisms hypothetically capable of providing some prospects for coordinated regulations of strategically important Central Asian energy sectors and address regional energy security challenges. This chapter provides the analysis of these regional-level energy governance innovations, which among a number of key functions, prioritize improving energy security through regional cooperation in Central Asia, and identifies major weaknesses of these innovations.

The Central Asian Regional Economic Cooperation

The CAREC is probably the largest and the most effective regional initiative in terms of the number of practically implemented projects in the energy sector in Central Asia. The CAREC is a program of partnership among ten countries (Afghanistan, Azerbaijan, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, People’s Republic of China, Tajikistan, Turkmenistan and Uzbekistan) supported by six multilateral institutions (the ADB, the European Bank for Reconstruction and Development, the International Monetary Fund, the Islamic Development

⁷ Derya Deniz, “Top Development Aid Groups in Central Asia: A Primer Devex,” *Devex*, April 23, 2011, accessed March 5, 2015, <https://www.devex.com/news/top-development-aid-groups-in-central-asia-a-primer-74324>.

Bank, the United Nations Development Programme and the World Bank).⁸ The initiative “CAREC 2020—Good Neighbors, Good Partners, and Good Prospects”⁹ perfectly lines up with the idea that the regional cooperation in the energy sector contributes to reliable, secure and stable supplies of the energy sources, which in its turn is believed to lead to economic growth and development. The CAREC has indeed developed comprehensive conceptual tools to promote regional trade and improve the level of energy security. However, the analysis shows that practically implemented regional-level energy projects are limited to technical assistance within the CAREC. In this sense, Central Asia is currently perceived more as a geographical territory composed of separate units within which the CAREC implements local and national energy projects.

The CAREC Energy Sector Development Strategy

For thirteen years, the overall input of the CAREC amounted to US\$24.6 billion for 158 projects in such areas of cooperation as transport, trade facilitation, trade policy, and energy.¹⁰ The energy sector received US\$4.6 billion of the total investment package. Having focused mostly on bilateral electricity trade and improving regional electric power grids, the CAREC completed more than 2,322 kilometers of electricity transmission lines.¹¹ Particularly in this sector, the CAREC aims to implement regional-level projects to improve energy security and energy-driven economic growth by ensuring stability and reliability of energy supplies through

⁸ Asian Development Bank, CAREC Unit, *Regional Cooperation at Work in Central Asia* (Metro Manila: Central Asia Regional Economic Cooperation Program, n.d), accessed December 1, 2014, <http://www.carecprogram.org/index.php?page=carec-program>.

⁹ Asian Development Bank, CAREC Unit, *A Strategic Framework for the Central Asia Regional Economic Cooperation Program 2011–2020* (Mandaluyong City: Asian Development Bank, 2012), 10, accessed May 5, 2014, <http://www.carecprogram.org/uploads/docs/CAREC-Publications/2012/CAREC-2020-Strategic-Framework.pdf>.

¹⁰ Asian Development Bank, CAREC Unit, *At a Glance* (Metro Manila: Central Asia Regional Economic Cooperation Program, n.d), accessed December 1, 2014, <http://carecprogram.org/>.

¹¹ Asian Development Bank, CAREC Unit, *Energy Results* (Metro Manila: Central Asia Regional Economic Cooperation Program, n.d), accessed December 1, 2014, <http://www.carecprogram.org/index.php?page=energy>.

improved trade of energy resources. The regional cooperation that the CAREC has claimed to be actively promoting is supposed to be a powerful instrument to implement national projects that brings benefits to all participating states.¹² It is expected that energy trade can overcome the consequences of uneven distribution of energy resources and seasonal variation of electricity production in the region. Cooperation will open up new energy market opportunities for the Central Asian producers, which is in line with their dependency-diversification-oriented foreign energy policies. Transit revenue is another encouraging factor for greater regional cooperation.

What distinguishes the CAREC from most of the regional initiatives in Central Asia is the fact that it is very much practical-results oriented.¹³ It also promotes mutually beneficial regional cooperation. Projects are implemented based on the following principles: (a) country ownership; (b) pragmatism and result orientation; and (c) 2+X principle, which is the development of strengthened partnership. The CAREC encourages Central Asian governments and non-state institutions to successfully pull their resources through a public private partnership initiative.¹⁴

The CAREC is the only actor/institutional mechanism in the region that has its own strategy for Regional Cooperation in the Energy Sector in Central Asia. This strategy is developed to assist member states to improve “energy security through the balanced development of the region’s energy infrastructure and institutions, and stronger integration of the region’s energy markets to make available adequate volumes of commercial energy to all in a reliable, affordable, financially sustainable, and environmentally sound manner; and economic

¹² Asian Development Bank, CAREC Unit, *Projects Supported by the CAREC Program*, (Metro Manila: Central Asia Regional Economic Cooperation Program, 2014), accessed December 5, 2014, http://www.carecprogram.org/index.php?page=carec-projects&or=energy#table_start.

¹³ Aidana Berdybekova, Personal interview, Regional Cooperation Coordinator (Consultant) Kyrgyz Resident Mission, Bishkek, Kyrgyzstan, February 4, 2014.

¹⁴ Asian Development Bank, CAREC Unit, “A Strategic Framework for the Central Asia,” 17.

growth through energy trade.”¹⁵ An Energy Work Plan (EWP) for the period of 2013–2015 of the CAREC was specifically designed to take concrete steps along the way toward achieving these goals. The EWP entails six main elements:

- Developing the Central Asia–South Asia Energy Corridor within CASA–1000 electricity transmission line and Turkmenistan–Afghanistan–Pakistan–India pipeline projects. These projects are designed to bring Central Asian natural gas and hydroelectricity to energy thirsty South Asian neighbours.
- Resolving regional energy dispatch and trade issues, which calls for the re-establishment of energy trade patterns between Uzbekistan and upstream Kyrgyzstan and Tajikistan, which was broken when Uzbekistan withdrew from the CAPS and cut gas supplies.
- Managing energy-water linkages. The resource-sharing mechanism in the region closely tied up water supply for irrigation and hydro-power production sectors. The Rogun and Kambarata–1 HPPs are essential to improve energy security of Kyrgyzstan and Tajikistan, but the construction of giant dams can affect water balance in Central Asia.
- Mobilizing funds to build energy facilities, assess countries’ own resources and attract potential private investors. The CAREC member countries differ in their economic development. Not surprisingly, countries with the lowest level of energy security are also the ones with limited financial resources—Tajikistan, Kyrgyzstan, Afghanistan and Pakistan. This organization is assisting member states to attract investments within public private partnership initiatives.
- Implementation of energy priority projects. The CAREC prioritizes modernization of energy infrastructure connecting Central Asian countries and building new production

¹⁵ *Strategy for Regional Cooperation in the Energy Sector of CAREC Countries* (Baku, Azerbaijan: Seventh Ministerial Conference on Central Asia Regional Economic Cooperation, 2008), 5, accessed March 24, 2015, <http://www.carecprogram.org/uploads/docs/CAREC-Regional-Cooperation-Strategy-in-Energy.pdf>.

and transportation facilities to increase states' export capacity and connect energy producing and consuming regions.

- Capacity building and knowledge management.¹⁶

While conceptually, the CAREC has developed a comprehensive instrument for promoting projects designed to contribute to energy security and energy-led economic growth through regional cooperation, so far it has implemented a few regional-level projects in the energy sector.¹⁷ It does not necessarily mean that the CAREC does not prioritize regional-level energy projects. It may, however, imply that in addition to financial constraints and investment-related risks to improve energy trade patterns there are political and security risks that are far more difficult to overcome, such as: (a) risks associated with internal and regional conflicts; (b) competing geopolitical interests of greater regional powers over the region's energy resources; (c) non-market regulations of energy supplies and payment risks associated with a "take or pay" trading arrangements; and (d) prevailing bilateral agreement over multilateral cooperation in the energy sector.¹⁸

Few Regional Energy Projects

Analysis of projects initiated within the CAREC and separately promoted by ADB shows that in the last two decades, of over sixty-two projects only four are regional and an additional

¹⁶ Asian Development Bank, CAREC Unit, *Energy Sector Coordinating Committee Work Plan 2013–2015* (Metro Manila: Central Asia Regional Economic Cooperation Program, 2012), accessed May 10, 2014, <http://www.carecprogram.org/uploads/docs/CAREC-Energy-Sector-Coordinating-Committee-Work-Plan-2013-2015.pdf>.

¹⁷ Asian Development Bank, CAREC Unit, *All Key Energy Projects* (Metro Manila: Central Asia Regional Economic Cooperation Program, n.d), accessed May 15, 2014, <http://www.carecprogram.org/index.php?page=all-energy-projects>.

¹⁸ Strategy for Regional Cooperation in the Energy Sector, 13–14.

three engage several Central Asian states. All these projects are in the form of technical assistance.¹⁹

Table 22: Regional-level Energy Projects within the CAREC

Title	Country	Funding Agency	Funding Type	Year	Status
Central Asia Regional Economic Cooperation: Power Sector Regional Master Plan	REG	ADB	Technical Assistance	2010	Ongoing
Central Asia Regional Economic Cooperation (CAREC) Members Electricity Regulators Forum	REG	ADB	Technical Assistance	2007	Ongoing
Establishment of the CAREC Members Electricity Regulators Forum	REG	ADB, Shared, PPIAF	Technical Assistance	2005	Completed
Regional Power Transmission Modernization Project in the Central Asian Republics	REG	ADB, Shared	Technical Assistance	2000	Completed
Central Asia–South Asia Regional Electricity Market Project	AFG, KGZ, TAJ	ADB, Shared	Technical Assistance	2007	Ongoing
Improved Management of Shared Water Resources in Central Asia	KAZ, KGZ, TAJ, UZB	ADB, Shared	Technical Assistance	2003	Completed
Regional Gas Transmission Improvement Project in the Central Asian Republics	KAZ, KGZ, TAJ, UZB	ADB, GKAZ, GKZ, GTAJ, GTKM, GUZB	Technical Assistance	2002	Completed

The CAREC energy strategy pays particular attention to three elements. First, it is a capacity building and knowledge sharing initiative that allows identifying the most lucrative investment projects so to give them priority in implementation. The second element takes certain measures that will lead to a favourable policy environment in which investors are ensured that their money is secure and will have their investments returned with interest. And third, while focusing on economically sound initiatives, the strategy distinguishes those that require domestic investments (energy efficiency and clean energy) and those that can be realized through the cross-border investment measures (cross-border energy transmission, facilitation of access/transit

¹⁹ Asian Development Bank, CAREC Unit, “All Key Energy Projects.”

to third-country energy markets, production for export, integration of energy markets, etc.).²⁰ Tensions in the relationships among Central Asian countries over some major energy projects force regional state actors to pursue energy policies, which distance them from each other. As a result, the Central Asian countries' energy policies prioritize local- and country-level energy development projects. Since the CAREC usually responds to governments' request to assist in implementation of energy projects, which are usually local in nature, it is not surprising that small projects constitute the absolute majority of the CAREC initiatives.²¹

Competing Energy Corridors

Another challenge preventing the implementation of regional-level energy projects is the fact that the CAREC claims to promote cooperation with external customers, but the export capacity of the region does not allow it. It is argued that the integration of energy markets will solve the problem of uneven distribution of energy resources among the CAREC countries and address some problems in the energy sector through optimizing existing energy interrelationships. Greater regional cooperation and trading energy resources are indeed possible: Central Asian rich hydrocarbon producers are surrounded by countries thirsty for energy resources either due to rapidly growing energy intense economies (China, Europe, Turkey), inherited energy infrastructure and interdependent energy sectors (Russia) or simply because they lack energy resources to meet their basic energy needs (South Asian countries); and, there is also yet unexploited hydro-power potential of Kyrgyzstan and Tajikistan that can increase the level of renewable and clean energy sources in the overall energy balance in all CAREC member states.

²⁰ Strategy for Regional Cooperation in the Energy Sector of CAREC Countries.

²¹ Ilkhom Teshabaev, Personal Interview, ADB Project Manager in Uzbekistan, Tashkent, Uzbekistan, June 20, 2013.

The strategy implies that in the medium- to long-term perspective regional cooperation will be developed within five priority energy corridors to integrate energy markets:

- Central Asia–East Asia: oil and gas exports from Kazakhstan and gas export from Turkmenistan and Uzbekistan to China;
- Central Asia–South Asia: Central Asian countries exporting natural gas and electricity to mainly Afghanistan and Pakistan;
- Intra-Central Asia Cooperation: gas, oil products and thermal electricity supply from downstream to upstream countries in exchange for hydroelectricity;
- Central Asia–Russian Federation: oil and gas exports to Russia and imports of Russian oil products; and
- Central Asia–European Union: supply of oil and gas from the Central Asian region.²²

Table 23: Regional Energy Corridors²³

		The two regions with the highest need and potential for integration			
Strategic Theme/Region	Central Asia–East Asia	Central Asia–South Asia	Intra-Central Asia	Central Asia–Russian Federation	Central Asia–European Union
Energy Demand/Supply Balance and Infrastructure Constraints	X	X	X		X
Regional Dispatch and Regulatory Development		X	X	X	X
Energy-Water Linkages		X	X		

²² Strategy for Regional Cooperation in the Energy Sector, 10.

²³“Energy Sector Coordinating Committee Work Plan 2013–2015.”

With the current pace of natural gas export capacity increase, Central Asian states would not be able to meet the external customers' expectations in all directions, existing and potential (45 billion m³ to Russia; 80 billion m³ to China; 20 billion m³ to Iran; 33 billion m³ to South Asia; and, approximately 30 billion m³ to Europe), in the near future because the current level of natural gas export capacity of Kazakhstan, Uzbekistan and Turkmenistan combined hardly exceed 65–70 billion m³ per year. It will even be challenging to keep up with gas export within existing several corridors, especially Chinese. So the regional energy trade within one corridor may negatively impact the availability of energy resources in other directions. While more powerful states use economic and political leverage to influence decision making and ensure energy flows toward their direction, less powerful countries are counting on multilateral institutions to secure energy supplies. However, alliances between multilateral donors with countries in need of such assistance seem not powerful enough to challenge major powers' interest in the region. In this competition, despite the fact that intra-Central Asian and Central Asia–South Asia partnerships require priority attention, cooperation in these directions is progressing extremely slowly. Most of the energy resources are consumed by or transited through Russia, which has inherited energy-transporting infrastructure, and China, which has connected its market with energy-producing Central Asian countries via newly built pipeline networks.

The Shanghai Cooperation Organization

The Shanghai Cooperation Organization was officially established on June 15, 2001 with full membership of Kazakhstan, the People's Republic of China, Kyrgyzstan, Russia, Tajikistan and Uzbekistan. Having started as a security organization with a particular focus on solving

border issues and then joining forces to fight against the three “isms” (terrorism, extremism and separatism), its activity was soon extended to economic cooperation. The political scientist Zhao Huasheng once argued that “if the SCO is unable to bring economic benefits to the Central Asian states, it is likely that they will focus their attention elsewhere, away from the SCO, leading to the weakening and irrelevance of the organization.”²⁴ Energy as a strategic commodity had immediately drawn the attention of state actors within the organization. Governmental representatives of the SCO member states argued many times for the necessity to establish an effective mechanism (governance innovation) to regulate the energy sector.

Institutional Framework

The SCO has developed quite a comprehensive decision-making and enforcement mechanism. Currently, energy projects are implemented within the framework of the SCO economic cooperation. The heads of State Council and the heads of Government Council are supreme decision-making bodies responsible for setting the course of the organization’s activity and addressing urgent issues. Meetings of ministers of economy, trade and transport deal with the concrete fields of activity in the energy sector. The Commission of Senior Officials in the fields of economy and trade develop detailed action plans to implement energy projects. The last body in the chain are Special Working Groups, which are responsible for providing customs services, standardization and certification procedures, investments, development of transit potential, information and communication technologies and energy resources.²⁵

²⁴ Zhao Huasheng, “The Shanghai Cooperation Organization at 5: Achievements and Challenges Ahead,” *China and Eurasia Forum Quarterly* 4, no. 3 (2006): 13.

²⁵ Secretariat of the Shanghai Cooperation Organization, *Brief Introduction to the Shanghai Cooperation Organization* (Beijing: Shanghai Cooperation Organization, n.d), accessed July 15, 2014, <http://www.sectsc.org/EN123/brief.asp>.

There are also other complementary bodies assisting in implementation of energy projects. The SCO Interbank Consortium is a special body that provides financial services for approved economic projects.²⁶ The SCO Forum is the platform for cooperation among national research institutions. The SCO Business Council is a non-governmental body that brings together representatives of the business community and is responsible for promoting economic development through facilitation of cooperation in such areas as science, technology, transportation, communication, investment and energy.²⁷ An important agency that the SCO member states have been counting on is the Energy Club.

The “Main” Energy Agency: The Energy Club

Russian President Vladimir Putin first presented the idea to create the SCO Energy Club during the International Conference on “Central Asian Energy Market: Tendencies and Perspectives” in 2005 in Tashkent, Uzbekistan.²⁸ A policy initiative to establish the SCO Energy Club was officially announced in 2007. Eight years later in December 2013, the SCO member states finally signed a memorandum on formally establishing the SCO Energy Club. According to the Russian deputy minister of Energy Anatoliy Yanovski, the main objective of the Club is to form recommendations to the SCO member states on how to behave in dynamically changing regional-energy markets and to ensure stability of the energy demand/supply balance. Because

²⁶ Secretariat of the Shanghai Cooperation Organization, *SCO Interbank Consortium* (Beijing: Shanghai Cooperation Organization, 2014), accessed July 10, 2014, <http://www.sectsco.org/EN123/show.asp?id=514>.

²⁷ “Secretariat of the Shanghai Cooperation Organization, *The Business Council of the Shanghai Cooperation Organization* (Beijing: Shanghai Cooperation Organization, 2009), accessed July 13, 2014, <http://www.sectsco.org/EN123/show.asp?id=52>.

²⁸ Shanghai Cooperation Organization, *Putin Suggested to Establish an Energy Club of the SCO* (Beijing: Shanghai Cooperation Organization, n.d), accessed May 20, 2014, http://www.sco-ec.gov.cn/crweb/scor/info/Article.jsp?a_no=33618&col_no=64.

the Club's decisions do not have enforcement power, they remain only recommendations.²⁹ Although the specifics of how the SCO regional mechanism will deal with energy security issues are still quite vague, this is the only organization that encompasses almost all Central Asian states and two major external energy importers (Russia and China), while engaging with other states interested in region's natural resources (India, Iran, Pakistan, Afghanistan, etc.) as observers.

According to official statements, there is an overall agreement among heads of states that “reliable and mutually beneficial partnership in the energy sector strengthens security and stability across the SCO region.”³⁰ This partnership (among producing, transit and consuming states), however, is limited to ensuring the stability of moving energy out of the region to China and Russia from and through Central Asian states. The SCO member countries signed a “Treaty on Long-Term Good—Neighborliness, Friendship and Cooperation between the Member States of the Shanghai Cooperation Organization” according to which they base their relationships on principles of equality and mutual benefit.³¹ However, both Russia and China consider Central Asian countries as sources of energy, and the partnership is focused on importing energy resources. Muratbek Imanaliev, former SCO secretary general, once highlighted that the idea to integrate consumers and producers in one union (the SCO Energy Club) is not promising and such agency will most likely turn into a sort of political union.³² And greater energy security may not necessarily be a primary objective of a politically-motivated organization. Energy

²⁹ “SCO Member States Agreed to Establish Energy Club,” *Kazenergy*, December 9, 2013, accessed July 5, 2014, <http://kazenergy.com/ru/press/2011-04-21-10-41-35/12013-2013-12-09-04-09-08.html>.

³⁰ Shanghai Cooperation Organization, *Bishkek Declaration of the Heads of the Member States of the Shanghai Cooperation Organization* (2007).

³¹ Secretariat of the Shanghai Cooperation Organization, *Treaty on Long-Term Good—Neighborliness, Friendship and Cooperation Between the Member States of the Shanghai Cooperation Organization* (Beijing: Shanghai Cooperation Organization, 2007), accessed June 15, 2013, <http://www.sectsco.org/EN123/show.asp?id=71>.

³² International Scientific Conference Materials, *The SCO in Quest of New Perception of Security* (Almaty: Kazakhstan Institute for Strategic Studies, 2008), 13.

projects that engage members of the organization are implemented according to bilateral agreements between China and Russia and each of the Central Asian countries separately, while the Energy Club remains only a formally-existing special agency of the SCO. Besides, the SCO member states still cannot agree on a united position over the common strategic energy concept.

Nursultan Nazarbaev highlighted that Kazakhstan strongly supports the idea to create the SCO Energy Club, “We think that the mechanism of Ministries of Energy meetings...must be organized within the framework of the SCO Energy club, which from our point of view, would become one of the main elements of [Kazakhstan’s] Asian Energy Strategy.” The strategy implies establishing an SCO energy agency that would serve as a “brain centre,” the information centre and the SCO energy exchange—trading energy on the SCO market.³³ The Asian Energy strategy aims to ensure:

- stable and reliable energy supplies for the population and economic needs of the participating states in the Asian energy strategy—adequate energy supplies during stable conditions and minimal energy supplies in case of emergencies;
- RES development (providing balance between fossil fuels and RES);
- diversification of energy sources (decreasing extensive dependence on a single energy source);
- respect for environmental concerns;
- energy efficiency and conservation;
- development of economic conditions to ensure the most cost efficient way of energy supplies to internal and external markets and rationalizing the structure of energy export; and

³³ International Scientific Conference Materials, *The SCO in Quest of New Perception of Security*, 55.

- innovative technologies are employed in the energy sector of the SCO member states.³⁴

However, the analysis shows that currently energy cooperation within the SCO is not developing in all directions as Kazakhstan, and probably all other Central Asian states, have been expecting.

Insufficient Export Capacity

The SCO member states can roughly be divided into exporters and importers of energy resources, in which Central Asian countries are part of the former. Moving energy out of the region in large quantities, with limited production level, threatens the availability of sufficient and affordable energy supplies for the population and economic needs of the Central Asian countries. Central Asian countries have signed agreements to supply over 80 billion m³ per year of gas to China, which is more than the region's export capacity. Kazakhstan is still not capable of filling an annual 20 million tonnes capacity oil pipeline to China on its own. The Chinese customers will also be looking for electricity import from upstream Central Asian countries once the conflict between Uzbekistan and Tajikistan/Kyrgyzstan is resolved. Such cooperation does contribute to the budget of the Central Asian exporters, but not to energy security, because of the limited energy production governments are increasing export capacity at the expense of domestic consumption.

One of the main resources in which both Russia and China are interested in is the natural gas of Turkmenistan and Uzbekistan. Turkmen gas has to pass several transit countries to reach Chinese and Russian energy markets. In this sense, what the SCO member states are concerned about is the security of energy supply flows. Article 3 of the Charter of the SCO implies that the

³⁴ International Scientific Conference Materials, *The SCO in Quest of New Perception of Security*, 121.

member states pool their resources to ensure “... effective use of available transportation and communication infrastructure, improvement of transit capabilities of member states and development of energy systems.”³⁵ Even Turkmenistan, which has maintained neutral status in almost all situations, supports the SCO initiatives on securing energy supply flows through the territory of the region. The President of Turkmenistan Gurbanguly Berdimukhamedov made it clear what the country expects from the engagement in SCO projects is: “the reliable and stable transit of energy reserves and its role in ensuring steady development and international cooperation.”³⁶

Prevailing Bilateral Arrangements

Despite the fact that heads of states and governments have many times declared that they support regional cooperation, most of the energy projects are still implemented on a bilateral or trilateral basis.³⁷ Bilateral agreements have been signed separately with several member states that in combination cover a wider range of issues and create the illusion of ongoing regional cooperation. For instance, China has signed contracts with Central Asian states to secure the movement of natural gas. The bilateral format of negotiations and agreements are then presented as an achievement of the SCO regional mechanism.³⁸ Construction of gas pipeline (Line-D) from Turkmenistan via Uzbekistan, Tajikistan and Kyrgyzstan to China is a good example. It is expected that the construction of transit sections will cost around US\$6.5 billion with the

³⁵ Secretariat of the Shanghai Cooperation Organization, *Charter of the Shanghai Cooperation Organization* (Beijing: Shanghai Cooperation Organization, 2009), accessed July 15, 2014, <http://www.sectsco.org/EN123/show.asp?id=69>.

³⁶ Secretariat of the Shanghai Cooperation Organization, *Chronicle of Main Events at SCO in 2009* (Beijing: Shanghai Cooperation Organization, 2009), accessed July 1, 2014, <http://www.sectsco.org/EN123/show.asp?id=182>.

³⁷ Adil Kaukenov, “Shanhayskaya Organizaciya Sotrudnichestva – Burnaya Deyatelnost ili Eyo Imitaciya?” (The Shanghai Cooperation Organization – Flurry of Activity or Its Imitation?), *ARKZ*, July 18, 2013, accessed September 5, 2014, <http://arkz.info/news/shanhayskaya-organizaciya-sotrudnichestva-burnaya-deyatelnost-ili-ee-imitaciya>.

³⁸ Ruslan Izimov, Personal Interview, Senior Research Fellow at Kazakhstan Institute for Strategic Studies under the President of the Republic of Kazakhstan, Almaty, Kazakhstan, August 25, 2013.

breakdown of the total sum as following: the Kyrgyz section—US\$1.3 billion, the Uzbek section—US\$2.2 billion and the Tajik section—US\$3 billion. Line-D of the CAGP will be financed 100 percent by China.³⁹ Agreements are signed with each country separately. Such achievement is in fact a result of an active Chinese energy policy in Central Asia, but it can hardly constitute a regional governance mechanism. Bilateral agreements within the SCO neither establish certain formal or informal practice nor take place within already functioning governance mechanisms as part of it. Such arrangements do not necessarily protect interests of all parties involved. The successful implementation of energy projects depends on a power balance that is determined by the extent of the major powers' interests. Unless energy projects promoted by bilateral agreements are implemented within the framework of well-functioning mechanisms, it is difficult to consider such arrangements as truly representing regional-level energy governance.

In organizations that do not have their own financial institution (the SCO Development Bank) and possess a limited budget it is not surprising that energy projects are financed through bilateral arrangements. The SCO member states still cannot agree on the concept of establishing an SCO bank to finance projects, including in the energy sector, from the six-sides talk perspective. Currently, the SCO investment policy is carried on through bilateral arrangements between states mainly in the following format: Russia and China on one-side and Central Asian states on the other. During the last visit of the Chinese leader Xi Jinping to Turkmenistan, Kazakhstan, Uzbekistan, and Kyrgyzstan from September 3–13, 2013, investment and loan

³⁹ Alesandra Jarosiewicz, "A Chinese Tour De Force in Central Asia," *OSW—Centre for Eastern Studies*, September 18, 2013, 18, accessed October 5, 2014, <http://www.osw.waw.pl/en/publikacje/analyses/2013-09-18/a-chinese-tour-de-force-central-asia>.

agreements worth US\$48 billion were signed, out of which Kazakhstan will receive US\$30 billion, Uzbekistan will receive US\$15 billion and Kyrgyzstan will receive US\$3 billion.⁴⁰

Again, what represents bilateral cooperation in the end is presented as cooperation within the SCO member states. Despite long-lasting negotiations on establishing the SCO bank, this level of integration has not been reached and cooperation in the energy sector remains in the format of interbank relationships. The chairman of Kazakhstan's Development Bank, Bolat Jamishev has stressed the importance of four investment projects within the SCO framework that are worth US\$3.5 billion, and which were initiated with Kazakhstan's contribution through the Development Bank of Kazakhstan of US\$900 million. These four investment projects are: (a) the second phase of the Kazakhstan electrolysis plant; (b) the Moynak HPP; (c) the Atyrau oil refinery plant; and (d) the expansion of the Aktau sea port.⁴¹ But in fact these projects were the result of interbanks cooperation within the framework of the SCO Interbank Consortium, in which banks of those countries directly involved in a particular project agreed to finance it. This Consortium incorporates the Kazakhstan Development Bank, the China State Development Bank, RSK Bank (Kirgizia), the state corporation "Bank for Development and Foreign Economic Affairs (Vneshekonombank—Russia)," the Tajikistan State Savings Bank "Amonatbank" and the Uzbekistan National Bank for Foreign Economic Affairs, but this does not involve six-party implementation and monitoring of energy projects.⁴²

⁴⁰ Timuri Yakobashvili, "A Chinese Marshal Plan for Central Asia?" *CACI Analyst*, October 2013, accessed March 20, 2014, <http://cacianalyst.org/publications/analytical-articles/item/12838-a-chinese-marshall-plan-for-central-asia?.html>.

⁴¹ Prime Minister of the Republic of Kazakhstan, "BRK Videlil 900 mln Dollarov na Realizaciyu Proektov v Ramkax Vzaimodeystviya Stran ShOS" (KDB Allocated 900 Million USD for Projects Realization Within the Framework of the SCO Member States Cooperation), *Prime Minister's Official Website* (2014), accessed December 1, 2014, <http://www.primeminister.kz/news/show/70/brk-vydelil-900-mln-dollarov-na-realizatsiju-proektov-v-ramkah-vzaimodejstvija-stran-shos-/11-09-2014>.

⁴² "The SCO Interbank Consortium Development Strategy Approved," *Vneshekonombank.ru*, November 7, 2011, accessed March 10, 2014, http://www.veb.ru/en/press/news/arch_news/index.php?id_19=28511.

Establishment of a SCO development bank is complicated by the fact that due to the difference in economic development and financial capabilities of the SCO member states they are not able to equally contribute to the budget of the bank from which energy projects are supposed to be financed. The largest contributor could be China, and it would want higher voting quotas in the promotion of particular initiatives. This, however, contradicts the main principle of cooperation within the SCO, which is the consensus-based decision-making mechanism. Russia, another major player in the SCO, is doing its best not to allow China to take such a leading position in the financial agency on which the development of the organization is so highly dependent.⁴³ In the absence of a well-functioning financial institution of the organization, expecting fair regional-level cooperation would be problematic.

No United Position over the Energy Security Concept

The SCO member states often engage in the dialogue with different expectations, which prevents reaching consensus on a number of issues and developing energy strategy and action plans on further implementation of regional-level energy projects. In 2007, during the second session of the Eurasian Economic Forum in Xi'an, China, the SCO secretary general Bolat Nurgaliev stated that “for the time being the member states of the Shanghai Cooperation Organization do not have a united position over the common strategic energy concept.”⁴⁴ After a round of negotiations during the summit, heads of the energy ministries of all member states failed to formulate a single SCO energy policy. Member states agreed to use expert-level discussions to develop a strategy amenable to all.⁴⁵ The SCO member states still do not have a

⁴³ Huasheng, “The Shanghai Cooperation Organization,” 8.

⁴⁴ Secretariat of the Shanghai Cooperation Organization, *Chronicle of Main Events at SCO in 2007* (Beijing: Shanghai Cooperation Organization, 2007), accessed January 15, 2013, <http://www.sectsco.org/EN123/show.asp?id=97>.

⁴⁵ Secretariat of the Shanghai Cooperation Organization, *Chronicle of Main Events at SCO in 2007*.

united position over the water-energy nexus, export–import balance, or the latent competition between China and any other customer for the Central Asian energy resources. Without reaching common understanding on these issues, it is impossible to develop a common strategic energy security concept.

The SCO Energy Club, as it was mentioned earlier, is a formally existing agency the main objective of which is to recommend its member states on the regional energy sector development. There is, however, another framework for cooperation as well. Most of the economic and as a result energy projects have been slowed down in pace due to the fact that decisions taken by the SCO bodies must be implemented in accordance with the procedures of member countries' national legislation.⁴⁶ Making declarations turned to be much easier than further implementation of projects. During the Third International Conference on “SCO Energy Forum/ Caspian Paradigm,” participants supported the idea to establish regular SCO member states' parliamentary meetings to address energy security and energy development issues. Since there is neither permanent nor effective multilateral enforcement mechanism, it was agreed the parliamentarians' meetings might create the platform for negotiations on a number of pressing issues.⁴⁷

All SCO member states consider energy as a strategic resource and want to use organization to promote their energy interests. The analysis of the SCO intergovernmental mechanism to promote regional-level energy projects shows that bilateral and trilateral agreements prevail over six-sided talks. State actors' desire to keep the bilateral format of

⁴⁶ Ingmar Oldberg, *The Shanghai Cooperation Organization: Powerhouse or Paper Tiger?* (Stockholm: Swedish Defence Research Agency, R-2301-SE, 2007), 22, accessed July 20, 2013, http://www.foi.se/ReportFiles/foir_2301.pdf.

⁴⁷ “Rossiya i Kazakhstan Sozdayut Mejdunarodnuyu Gruppu po Kaspiyu (Russia and Kazakhstan are Establishing International Group on Caspian Sea),” *Easttime News*, September 21, 2013, accessed October 15, 2014, <http://easttime.ru/news/kazakhstan/rossiya-i-kazakhstan-sozdayut-mezhdunarodnuyu-gruppu-po-kaspiyu/4766>.

interaction is not a problem, unless actors that do not support that format due to asymmetry in power balance cannot change it. However, to what extent a set of bilateral arrangements can represent an effective regional mechanism is questionable. Currently, all energy initiatives are implemented within the broader economic cooperation framework. The SCO Energy Club is the only agency specifically designed to deal with energy security and energy-led economic development issues and it does not have an enforcement power. Mutually exclusive interests of the SCO member states—countries' interests, not the interests of certain groups—prevent them from developing common energy security strategy.

The Eurasian Economic Union

Russia has always been a key player in the Central Asian energy sector. Despite the fact that it has kept engaged with Central Asian states on a bilateral basis in the areas of oil, gas and electricity export/import relations, Russia has been periodically encouraging regional integration processes, which, among a variety of areas of cooperation, are designed to include the strategically important energy sector as well. The EEU was launched on January 1, 2015 according to the agreement among the leaders of Armenia, Belarus, Kazakhstan and Russia. An agreement to incorporate Kyrgyzstan in the EEU was signed on December 23, 2014.⁴⁸ It joined the Union in May 2015. Tajikistan is another candidate. The EEU is the final stage of an economic integration process, which started in 2000. In 1999, Belarus, Kazakhstan, Kyrgyzstan, Russia and Tajikistan signed an agreement on the Customs Union and Common Economic

⁴⁸ "Eurasian Economic Union Heads of State Sign 20 Documents," *Itar-TASS*, 2014, <http://itar-tass.com/en/economy/768795>.

Space.⁴⁹ The document determined three levels of integration: the Eurasian Economic Community (EurAsEC); the Common Economic Space and the Customs Union of Belarus, Kazakhstan and Russia; and the Eurasian Economic Union.

Institutional Apparatus of the EEU

The EurAsEC was created in 2000 with full membership of Belarus, Kazakhstan, Russia, Kyrgyzstan and Tajikistan; Uzbekistan joined the organization later in 2006. The presidents of Belarus, Kazakhstan, Russia and Ukraine signed the agreement on establishing the Single Economic Space (SES) in 2003. However, the SES became operational only starting from January 1, 2012. The process of establishing the Customs Union (CU), a single customs area, took three years from 2007 until 2010, when it was enacted on January 1, 2010. In 2012, the Eurasian Economic Commission began to work as the permanent supra-national regulatory body of the Customs Union and the Single Economic Space. The Commission set up a deadline of January 1, 2015 for the codification of international agreements, which would establish a legal and regulatory framework of the Customs Union and the Single Economic Space, on the basis of which the EEU was to be founded.⁵⁰

As a successor of the EurAsEC and the CU, the EEU inherited a mechanism designed to regulate a wide range of intergovernmental relations. The remaining unresolved and pressing issue is the free movement of some particular types of energy resources. So, to have a clear vision of what to expect from energy export/import relationships within the newly established

⁴⁹ Embassy of the Russian Federation to the Republic of Kazakhstan, *Eurasian Economic Integration in Progress* (Astana: Embassy of the RF to Kazakhstan, 2013), 23, accessed October 5, 2014, http://www.rfembassy.kz/eng/lm/integracija/evraziiskaya_integraciya/.

⁵⁰ Eurasian Economic Commission, *Eurasian Economic Integration: Facts and Figures* (Moscow: Library of Eurasian Integration, 2014), 7, accessed December 1, 2014, http://www.eurasiancommission.org/en/Documents/broshura26_ENGL_2014.pdf.

EEU, it is important to understand how regional-level cooperation in the energy sector has been developed within the EurAsEC and the CU.

For a period of ten years, the EurAsEC had developed two conditions to promote regional cooperation in the energy sector: economic (including the energy sector) integration and institutional apparatus.

The Council on Energy Policy, within the EurAsEC and now the EEU, is the main agency responsible for the development and implementation of regional-level energy projects. Along with the Council on Energy Policy, the other agencies involved in the process of establishing a unified energy system are: (a) the Electricity and Nuclear Policy Department; (b) the Oil and Gas Policy Department; (c) the Advisory Committee for Electricity; and (d) the Advisory Committee for Oil and Gas. The Advisory Committee for Oil and Gas established in 2012 is, for instance, responsible for Eurasian Economic Commission board proposals concerning the development of common energy policies in the field of oil and gas, energy markets, determining the bases for pricing and tariff policy in the field of gas transportation.⁵¹

Conceptual Framework of the EEU

In 2003, the Council on Energy Policy adopted fundamentals of the EurAsEC energy policy, which were designed to establish unified energy, information and transportation systems.⁵² The policy prioritized joint activity oriented toward rational use of energy resources and formation of the common complementary fuel-energy complexes of the Community member

⁵¹ Eurasian Economic Commission, *EEC Advisory Committee for Oil and Gas Held its First Meeting* (Moscow: Eurasian Economic Commission, 2013), accessed December 1, 2014, <http://eurasiancommission.org/en/nae/news/Pages/65464654.aspx>.

⁵² Eurasian Economic Community, *Fundamentals of Energy Policy of the Eurasian Economic Community* (Moscow: Eurasian Economic Community, 2003), accessed February 20, 2011, <http://evrazes.com/docs/view/152>.

states based on increasing efficiency of energy systems, development of transit potential and creation of favourable conditions to increase intergovernmental supply of energy resources.

Having realized the importance of the energy sector to complete the process of economic integration, the EurAsEC set a number of key objectives in its energy policy:

- developing mutually beneficial cooperation in the energy sector and joint efforts to establish the common energy market;
- adequately supplying the internal market with energy resources and increasing exports to third countries;
- establishing a wholesale market of electricity;
- rationally using water, fuel and energy resources;
- extending cooperation in developing, processing, and exporting new hydrocarbon resources;
- developing transit potential;
- ensuring energy security and creating conditions for stable economic growth.⁵³

Based on the principles of respect for states' sovereignty and national interests as well as mutual responsibility for the decisions made and actions taken, the EurAsEC member states set the course toward ensuring energy security by forming the common market of energy resources.⁵⁴ Despite having a comprehensive and a well-developed conceptual understanding of what and how they want to improve energy security, no significant progress has been made in terms of energy sectors integration in the region.

⁵³ Eurasian Economic Commission, "Fundamentals of Energy Policy."

⁵⁴ "Energy independence—endowment of EurAsEC member states with local energy resources based on market demands, as well as the potential for usage and/or reservation of alternative sources to import fuel and energy. Energy security—the security of the EurAsEC member states' energy sector against internal and external conditions, processes and factors posing a threat to its stable development and energy independence" in Eurasian Economic Commission, "Fundamentals of Energy Policy."

It was expected that the next stage of economic integration, which was the CU of Belarus, Kazakhstan and Russia of 2010,⁵⁵ would turn plans to liberalize energy markets into reality. Although, to a certain extent, barriers preventing free movement of resources had been eliminated, neither the EurAsEC nor the CU succeeded to develop an effective regional mechanism regulating energy trade. Russia, the strongest supporter of an economic integration, confronted the formation of common energy markets, which bore an additional financial loss.

Exporters' Interests Do Not Match Those of Importers'

Currently, out of five Central Asian states only Kazakhstan has been a founding member of the EEU. Kyrgyzstan has recently joined it. Negotiations on the inclusion of Tajikistan are in progress. Taking into account the fact that Russia is using its influence in the region and may succeed in getting all these states on board, the EEU can be considered a regional platform capable of affecting energy supply relations in Central Asia. To make the below presented analysis applicable to future EEU energy relations, I decided to approach the issue of effectiveness of this mechanism from the perspective of both importing and exporting states.

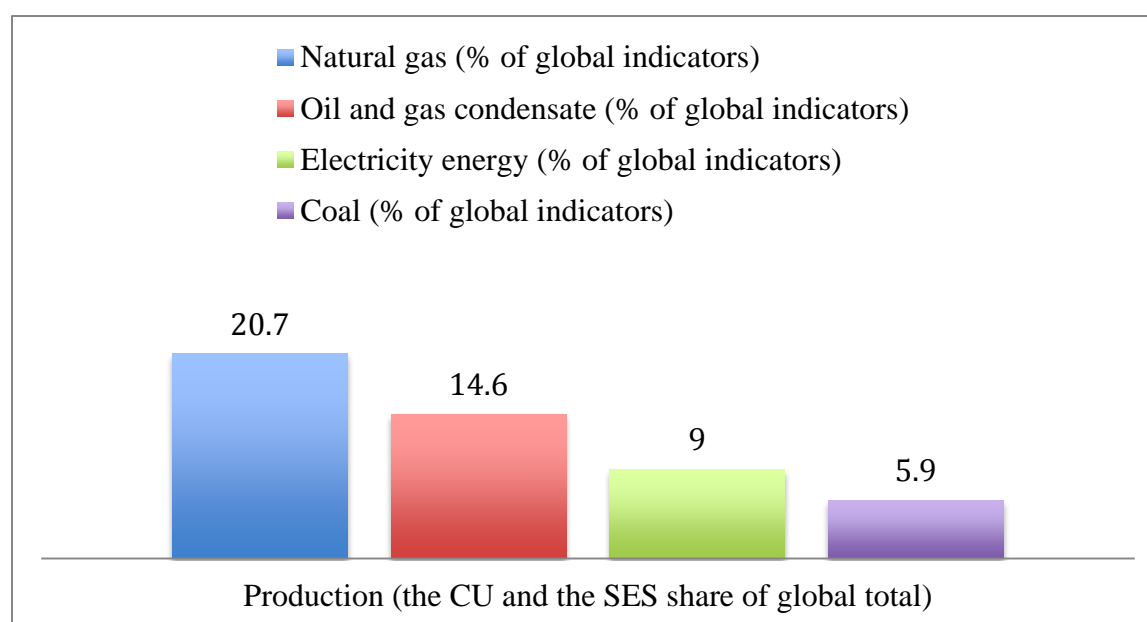
The EEU member states pursue energy resources differently depending on whether they hold the status of importing or exporting country. Importing countries pursue energy resources as a market commodity similar to other products. They want to receive those resources for the lowest price possible and then further dispose of them on their own accord. Exporters, in contrary, consider energy as a strategic commodity and would not refrain from using this strategically important resource to gain political and security leverage. The EEU eliminated customs tariffs allowing free movement of products among its member states. However, free

⁵⁵ Ministry of Foreign Affairs of the Republic of Kazakhstan, *The Customs Union and the Common Economic Space of the Republic of Belarus, the Republic of Kazakhstan and the Russian Federation* (Astana: Mfa.kz, 2015), accessed January 29, 2015, <http://www.mfa.kz/index.php/en/foreign-policy/integration-processes/customs-union>.

movement of products within the EEU excluded more than a hundred items for Kazakhstan and Belarus including and especially the most traded oil, natural gas, electricity and oil products.⁵⁶

The irony is that among many of the 2012 graphs displaying the international rankings of member states of the CU and the SES by goods output indicators, (See Figure 9) the Eurasian Economic Commission decided to choose the one indicating the share of those products that Kazakhstan and Russia have a large share of but that are not regulated by the CU.⁵⁷

Figure 9: Production (the CU and the SES Share of Global Total), 2015



Energy (re) export/import as well as transit relations have always been important issues on the CU agenda. Belarus imports large quantities of Russian energy resources for a discounted price and based on annually renewed bilateral agreements. Russia and Kazakhstan agreed to regulate current supplies of crude oil and oil products for a year starting from January 1, 2014. To the question of whether Central Asian region is ready for the common energy market, the

⁵⁶ Agata Vierbovska-Miazga, "Customs Union Summit: Crisis Instead of Success," *Center for Eastern Studies*, October 30, 2013, accessed June 10, 2014, <http://www.osw.waw.pl/en/publikacje/analyses/2013-10-30/customs-union-summit-crisis-instead-success>.

⁵⁷ Eurasian Economic Commission, *Eurasian Economic Integration: Facts and Figures*.

answer is, to certain extent, yes. There is a history of parallel operations of regional energy systems, and there are a number of agreements signed among Central Asian states regulating almost all aspects of energy trade and movement of energy resources within the CAES.⁵⁸ However, Russia insisted on using a bilateral format for regulation of the movement of these particular types of energy resources. Absence of common oil, gas and electricity markets within the CU raised concerns in both Kazakhstan and Belarus.

Conflicting Fundamental Positions

The shadow economy of the Republic of Belarus benefitted from re-export or/and export of products from refined Russian oil to the European markets. Kazakhstan has been looking forward to the integration of energy sectors with Russia, which would allow it to sign direct contracts with European customers using Russia as a transit country only. Kazakhstan imports more energy resources than it exports to Russia, and Belarus is the only importer of Russian energy. Building on its reputation as mainly an exporter of energy, Russia will keep postponing the process of liberalization of energy markets as long as it can. Meanwhile for the other Union member states free movement of energy resources will continue to remain a pressing issue on the agenda.

Since Kazakhstan is both an importer and exporter of energy resources, its foreign energy policy differs depending on how it positions itself. Within the CU, Kazakhstan, as an importer of energy resources, voted for the liberalization of oil, gas and electricity markets, which would allow it to import oil products and electricity without customs tariffs from Russia. However, out of 140 products of the Group 27, only six of them do not fall under the regulation of the Union,

⁵⁸ Michael Becker, "Regional Energy Market in Central Asia," *RESET*, May 2011.

including natural gas in a gasified form, crude oil and oil products and electricity.⁵⁹ This condition implies that neither Belarus nor Kazakhstan enjoys free access to the Russian energy market and the possibility to transit electricity and oil products is limited. Having placed strategic interest in energy resources to use them as an instrument to influence the Union members and potential candidates along with the fact that it earns high revenue from customs fees, Russia is not willing to liberalize its energy market yet.⁶⁰

Countries that import more energy resources, which are not regulated by the CU, than they do export lose more revenue, because custom tariffs increase the price for a unit of energy sold to external markets. From January to March 2013, the volume of Kazakhstani crude oil and gas condensate supplies to Russia accounted for 17,692.8 tonnes, while the volume of the Russian exports to Kazakhstan of these same products was 100 times more in the amount of 1,977,205.7 tonnes. During the same period, Kazakhstan imported 56,362,278 thousand litres of oil products from Russia, while exported 181,4 thousand litres of the same products to Russia.⁶¹ A large amount of these refined products come from the Kazakh crude oil and natural gas, which is exported to Russia, refined and then sent back to Kazakhstan. In this regard, Kazakhstan would want these items of the group 27 to move freely within the territory of the CU. Currently,

⁵⁹ Eurasian Economic Commission, *Gruppa 27: Toplivo Mineralnoe, Neft i Produkty ix Peregonki; Bituminoznye Veshchestva; Voski Mineralnye* (Group 27: Mineral Fuels, Oil and Products of its Distillation; Bituminous Substances; Mineral Waxes) (Moscow: Eurasian Economic Commission, n.d), accessed May 10, 2014, <http://www.tsouz.ru/db/ettr/PSN/Pages/psn27.aspx>.

⁶⁰ Nikolay Surkov, "Evraziyskiy Ekonomicheskiy Soyuz v Zamen Tamojennogo Soyuz (Eurasian Economic Union to Replace the Customs Union)," *RBTH*, October 28, 2013, accessed March 5, 2014, http://rbth.co.uk/international/2013/10/28/eurasian_economic_union_to_replace_customs_union_31237.html.

⁶¹ Customs Union and Single Economic Space, *The Volume of Import Supplies of the Republic of Kazakhstan from States – Members of the CU and Single Economic Space for January-March 2013* (Moscow: Customs Union and Single Economic Space, 2013), accessed December 1, 2014, http://www.tsouz.ru/db/stat/iCU201303/Documents/i201303_10.pdf; and Eurasian Economic Commission, *The Volume of Export Supplies of the Republic of Kazakhstan to States – Members of the CU and Single Economic Space for January-March 2013* (Moscow: Customs Union and Single Economic Space, 2013), accessed July 5, 2014, http://www.eurasiancommission.org/ru/act/integr_i_makroec/dep_stat/trade/vzaim_stat/iCU201311/Documents/i201311_11.pdf.

Russia–Kazakhstan energy export/import relations are regulated by a bilateral agreement renewed every year. Even though the Russian government applies a preferential pricing policy toward members of the Union, in the absence of an effective/multilateral mechanism designed to regulate energy movement, most of the now EEU (inherited the CU regulations) member states will remain vulnerable.

Kazakhstan's position changes when it comes to export of energy resources to third parties, because in this case it is a major exporter of crude oil. Export of oil and gas is the driving force of Kazakh economy, which generates 25 percent of GDP and more than 70 percent of overall export. Kazakhstan is not interested in energy markets of other Union member states, where Russian products already dominate. It focuses on external markets.⁶² In this sense, Kazakhstan supports energy policy promoted by the Russian side, which secures revenues from customs tariffs from exporting oil and gas to external markets. The money from customs tariffs is directed to the budget of the exporting state and is not distributed according to the regulations of the Union. Within the Union (the CU and now the EEU), export of energy resources is regulated by bilateral agreements. But the money coming from re-export of energy goes back to the budget of the energy-producing state. Belarus used to benefit from importing Russian crude oil and natural gas, refining these resources and re-exporting these oil products to the European markets. Belarus produced 1.7 million tonnes of petroleum and gas condensate and refined 21.7 million tonnes of this same product from Russian resources in 2012.⁶³ Now, Belarus is obliged to transfer the difference that it earns from re-exporting energy to the Russian budget. Belarus

⁶² “Neftegazovaya Otrasl Obespechivaet 25% VVP RK: Dobicha Nefti v Kazaxstane Virosla Bolee Chem v Tri Raza (Oil and Gas Industry Provides 25 percent of GDP of Kazakhstan: Oil Production in Kazakhstan Increased Three Folds),” *Kapital.kz*, 2013, accessed March 5, 2014, <http://kapital.kz/economic/21860/neftegazovaya-otrasl-obespechivaet-25-vvp-rk.html>.

⁶³ Belstat, “Belneftekhim” Ministry of Oil and Gas of the Republic of Kazakhstan, Ministry of Power Engineering of Russia, accessed December 5, 2014, http://eurasiancommission.org/en/act/energetikaiinfr/energ/energo_stat/Pages/neft.aspx.

transferred US\$4 billion to the Russian budget in 2012, which was US\$1 billion more than it did in 2011.⁶⁴

Table 24: Extraction and Refining of Oil and Gas Condensate in 2012⁶⁵

	Million tonnes
Extraction of oil and gas condensate in 2012	
Belarus	1.7
Kazakhstan	79.2
Russia	517.9
Oil and gas condensate refining in 2012	
Belarus	21.7
Kazakhstan	15.0
Russia	265.8

Unregulated energy supplies, however, are negatively affecting the volume of energy trade among the Union member states. As a result, the volume of energy trade as a share of the total trade among CU member states showed the following dynamics: 34.9 percent in 2011, 33.4 percent in 2012, and 28.9 percent in 2013.⁶⁶ This contradicts the main principles of the Union, which focus on the increasing trading dynamics and energy-trade-driven economic development. Besides, in the absence of common terms of regulations parties may choose to employ protectionist measures that negatively affect trading dynamics. For instance, import of Russian oil products was restricted by decree from the government of Kazakhstan on April 23, 2013.

⁶⁴ “Rossiya Gotova Snyat Ogranicheniya v Tamojennov Soyuze Esli i Drugie Sdelayut Toje Samoe (Russia Is Ready to Give Up Restrictions in Customs Union if Others Do the Same),” *Voice of Russia, Interfax*, October 25, 2013, accessed May 5, 2014, http://voiceofrussia.com/news/2013_10_25/Russia-ready-to-give-up-restrictions-in-Customs-Union-if-others-do-the-same-Putin-5313/?slide-1.

⁶⁵ Belstat, “Belneftekhim.”

⁶⁶ “‘Serie Zoni’ Tamojennogo Soyuz—Rezultat Nedointegracii (‘Grey Zones’ of the Customs Union—the Result of Incomplete Integration),” *Eurasian Economic Commission*, January 20, 2014, accessed May 1, 2015, <http://www.eurasiancommission.org/ru/nae/news/Pages/22-01-2014-2.aspx>.

Isolated National Energy Systems

In addition to the above-mentioned regulatory challenges within the Union, Central Asian countries have to deal with physical isolation of their energy systems from that of Russia's. Russian electric power grids are only connected to the northern part of Kazakhstan and west Kazakhstan's electric power zones. Southern parts of Kazakhstan and Kyrgyzstan's (as well as potential candidate Tajikistan) energy systems are part of the Central Asian electric power grids and gas pipeline networks. On top of that southern Kyrgyzstan and northern Tajikistan are connected to the Kazakh electricity system through Uzbekistan, which is not even considering membership of the EEU. Establishing the EEU energy system will not only take time, but will also require investments that the regional actors are not willing to provide. In this sense, it is quite challenging to establish a parallel operation of the unified energy system when such systems do not physically exist.

Minister of Energy and Infrastructure of the Eurasian Economic Committee, Daniel Akhmetov once claimed that a common oil and gas market between Belarus, Kazakhstan and Russia could be created by January 1, 2015.⁶⁷ Not surprisingly, this statement was followed by the announcement that the Union member states are not yet ready to completely liberalize energy markets. The chairperson of the Eurasian Economic Commission Viktor Xristenko later announced that a common oil and gas market would be formed by 2025. The President of Belarus reacted aggressively to this by saying, "We bought the product, processed and then sold it—the gain is ours. We are told that this is a specific product and thus we'll do it this

⁶⁷ "Obshiy Rinok Nefti i Gaza Belarusi, Rossii i Kazakhstana Mojet Bit Sformirovan k 1 Yanvarya 2015 Goda – Minister EEK (Common Oil and Gas Market of Belarus, Russia, and Kazakhstan Could be Formed by January 1, 2015)," *Belta*, February 6, 2013, accessed April 5, 2014, http://www.belta.by/ru/all_news/economics/Obshij-rynok-nefti-i-gaza-Belarusi-Rossii-i-Kazaxstana-mozhet-byt-sformirovan-k-1-janvarja-2015-goda---ministr-EEK_i_623314.html.

way...Russia first suggested taking it to the level of bilateral agreements. That is why we started these negotiations.”⁶⁸ There was a similar reaction from the government of Kazakhstan.

Russian Opposition and Future Prospects

Russia strongly opposes the liberalization of energy trade within the Union for such items as oil, natural gas and electricity. One could argue that an economic loss forces Russia to confront removing customs tariffs for those particular items. But the fact that annually renewed bilateral agreements with Belarus, Kazakhstan and now Kyrgyzstan already exclude export tariffs for oil products, gas and electricity, imply that it is not about the financial loss but rather political leverage (threat of declining the renewal of contracts) that Russia is not ready to give up.

Terms of the EEU came into force on January 1, 2015. Within the EEU framework member states will use a single-mechanism regulating economy to harmonize their legislation, create unified energy, transport, and communication infrastructure, a coordinated tax system and a trade and customs policy aimed at ensuring the free movement of goods, services, capital and labour force. But the concept of establishing common energy markets will only be adopted in 2016 and the program will be developed by 2018. It is also expected that the common electricity market of the EEU will be formed by 2019 and oil and gas market only in 2025. The liberalization of energy markets should be accompanied by a harmonization of the laws between the Union member states and the establishment of supra-national financial centres to implement regional-level energy projects.⁶⁹ Even though the Russian government applies preferential

⁶⁸ “Lukashenko Napravilsya v Kazaxstan, Chtobi Podpisat ne Sovsem Tot Dogovor o EAES, na Kotoriy Raschitivala Belarus (Lukashenko is Heading to Kazakhstan to Sign not the Same Agreement on the EEU that Belarus Was Expecting),” May 28, 2014, <http://news.tut.by/politics/400916.html>.

⁶⁹ Eurasian Economic Commission, “Important Events in the Activity of the Department of Energy,” 2014, accessed January 5, 2015, <http://eurasiancommission.org/ru/act/energetikaiinfr/energ/events/Pages/default.aspx>.

energy pricing and a customs tariff-free policy toward members of the Union, in the absence of an effective/multilateral mechanism designed to ensure free movement of energy resources, most of the EEU member states will remain vulnerable. And there should be a good reason for Russia to let the common energy markets of the EEU be formed, such as to keep the Union afloat.

The Commonwealth of Independent States

The CIS as a governance mechanism was established to sustain intergovernmental relations among former Soviet Union member states in almost all areas of interaction, including the energy sector. Founded on December 8, 1991, the CIS is the former Soviet Republics' oldest institutional framework. Central Asian states joined it two weeks later on December 21, 1991 with full membership, except Turkmenistan, which is an associate member of the organization. The CIS's competence extends to activities in the realm of trade, finance, security, human rights, social and economic development, including cooperation in the energy sector. But since it does not possess an effective enforcement mechanism, it is often considered a loose association of states rather than an organization capable of strengthening regional cooperation. However, over the quarter of a century of its existence, the CIS succeeded to develop a comprehensive legal basis by which to regulate a wide range of intergovernmental activities including in the energy sector, which can be and often is used by other regional institutions in the process of developing their own integration initiatives.

Main Energy Agencies of the CIS

The CIS has developed an energy sector governance apparatus, which encompasses: the Intergovernmental Council for Oil and Gas; Electric Power Council of the CIS; the Intergovernmental Council on cooperation in the spheres of chemicals and petro-chemicals; CIS

member states' Committee on Using Nuclear Power for Peaceful Purposes.⁷⁰ The Intergovernmental Council for Oil and Gas, for instance, is responsible for a number of key activities including making projections on how to secure sufficient supplies of oil, gas and their refined products for the ten to fifteen year perspective, arranging bilateral and multilateral agreements based on these projections, analyzing the process of implementation and other activities ranging from research to practical moves to ensure stability and reliability of common energy systems' operation.⁷¹

The CIS has probably the most comprehensive package of intergovernmental agreements regulating the electricity sector in the former Soviet republics, including in Central Asian countries.

Table 25: Main Agreements and other documents in the Energy Sector within the CIS⁷²

1. Agreement on Coordination of Interstate Relations in the Power Sector of the Commonwealth of Independent States, signed by the Council of Heads of Governments on February 14, 1992
2. Treaty on Ensuring Parallel Operation of Power Systems of the States – Members of the Commonwealth of Independent States, signed by the Council of Heads of Governments on November 25, 1998
3. Decision of the Council of Heads of Governments on Implementation of the Treaty on Ensuring Parallel Operation of Power Systems of the States – Members of the Commonwealth of Independent States on November 28, 1998
4. Agreement on Transit of Electricity and State's Power Capacities – Members of the Commonwealth of Independent States on January 25, 2000
5. Agreement on Mutual Assistance in Cases of Accidents and Other Emergency Situations at Electric Power Facilities of States – Members of the Commonwealth of Independent States on May 30, 2002
6. Agreement on Cooperation of States – Members of the Commonwealth of Independent States in the Field of Energy Efficiency and Conservation, signed by the Council of Head of Governments on October 7, 2002

⁷⁰ Commonwealth of Independent States, *Information on Bodies of the Commonwealth of Independent States* (Internet-Portal CIS, n.d), accessed June 10, 2014, <http://www.e-cis.info/page.php?id=2374>.

⁷¹ "Commonwealth of Independent States Executive Committee, *Intergovernmental Council on Oil and Gas* (Minsk: Commonwealth of Independent states, n.d), accessed June 10, 2014, <http://www.cis.minsk.by/page.php?id=2498>.

⁷² The list of agreements is retrieved from the official website of the Commonwealth of Independent States Executive Committee: <http://www.cis.minsk.by/index.php>.

7. Agreement on the Establishment of Reserves of Resources and Their Effective Use to Ensure Stable Parallel Operation of Power Systems of States – Members of the Commonwealth of Independent States, signed by the Council of Heads of Governments on September 15, 2004
8. Decision of the CIS Economic Council of the Regulation on the Energy Council of the Commonwealth of Independent States in the new edition of March 11, 2005
9. Decision of the CIS Economic Council on the Main Directions and Principles of Cooperation of States – Members of the Commonwealth of Independent States in the Field of Energy Efficiency and Conservation from March 11, 2005
10. The Concept of Common Electricity Market Formation of States – Members of the Commonwealth of Independent States, approved by the decision of the Council of Heads of Governments on November 25, 2005
11. Decision of the Council of states of Governments on Establishing a Common Time for Reading Electric Power Meters of Electricity Moving through Interstate Transmission Lines in States – Members of the Commonwealth of Independent States of November 24, 2006
12. Agreement on Harmonization of Customs Procedures when Moving Electricity Across the Customs Borders of States – Members of the Commonwealth of Independent States on November 22, 2007
13. Protocol on Amendments and Additions to the Agreement on Coordination of Interstate Relations in the Field of Energy of the Commonwealth of Independent States from February 14, 1992 on November 22, 2007
14. Agreement on the Formation of a Common Energy Market of States – Members of the Commonwealth of Independent States from May 25, 2007
15. Agreement on Cooperation Among States – Members of the Commonwealth of Independent States in the Field of Exploitation of Interstate Transmission Lines of National Electric Power Systems from November 20, 2009
16. Protocol on the Stages of the Formation of the Common Energy Market of the CIS Member States from May 21, 2010

Conceptual Instruments of the CIS

The CIS has also adopted its own “Development Strategy 2020” and has been working on establishing the United Energy Space by promoting cooperation in such areas as energy efficiency, rehabilitation of the parallel operation of the CIS countries’ Unified Electric Power Systems and the development of a stable mechanism for electricity transit. The CIS is

particularly concerned about the security of energy transit. Transmission lines of the CIS member states were constructed during the Soviet Union and now cross territories of several countries. The CIS countries acknowledge that it is necessary to establish a well-functioning energy system to ensure stability and security of electricity and hydrocarbons' transit (transit of energy produced in one country and going out to another country over the territory of the third country, as well as transit of energy produced and to be consumed in one country that is being transported over the territory of another country),⁷³ but fail to provide transit security due to the absence of an enforcement mechanism.

On November 20, 2009, the CIS member states adopted the concept for energy sector cooperation, which is absent in most of the regional institutions in Central Asia. Having placed strategic importance in energy development, the CIS Council declared the energy sector to be a key area of interaction in 2009. Trans-boundary transmission lines connecting several countries received particular attention from the Council, because such networks required coordinated actions to be taken and the CIS offered the platform for joint regulation.⁷⁴ The action plan adopted on May 21, 2010 was supposed to take a practical approach to address first priority projects,⁷⁵ most of which are yet to be realized.

⁷³ Commonwealth of Independent States Executive Committee, *Agreement on Transit of Electricity and State's Power Capacities – Members of the Commonwealth of Independent States* (Minsk: Commonwealth of Independent states, n.d), accessed June 5, 2014, <http://www.cis.minsk.by/page.php?id=1946>.

⁷⁴ “Commonwealth of Independent states Executive Committee, *Energy is the Key Area of Cooperation of the CIS Countries in 2009* (Minsk: Commonwealth of Independent States, 2009), accessed June 5, 2014, <http://www.cis.minsk.by/page.php?id=13376>.

⁷⁵ Commonwealth of Independent States, *O Razvitii Sotrudnichestva Gosudarstv – Uchastnikov SNG v Sfere Elektroenergetiki. Problemi i Perspektivi (On the Development of Cooperation of CIS Member States in the Field of Energy. Problems and Perspectives)* (CIS Internet Portal, 2013), accessed May 20, 2014, <http://www.e-cis.info/page.php?id=23654>.

Separated Sub-Regional Energy Systems

Having adopted the strategy, developed the concept and action plan the CIS member states still could not agree upon using balanced methods for oil, gas, and electricity supply and transit. The main reason for disagreement over the shipment methods is that not all energy systems of the former Soviet Union were connected to one another. On top of that, two decades of independent energy policies broke down even existing systems into smaller pieces. Since the CIS energy systems are not properly connected, it turned to be quite difficult to ensure coordinated operation of those systems. For instance, Central Asian electric power grids are not properly connected to that of the Russian and other CIS member states. Turkmenistan left the CAPS system in 2003, but it is the withdrawal of Uzbekistan that impacted the coordinated operation of the CAPS the most. Uzbekistan's withdrawal left the electric power sector of Tajikistan in complete isolation. Only Kazakhstan, Kyrgyzstan and Uzbekistan sustain electricity trade on annually prolonged bilateral contracts. Even though the infrastructure connecting Central Asian countries' electric power sectors is still in place, the CIS as a governance mechanism fails to encourage or enforce state actors to reinstate parallel operation of the electric power grids.

CIS member states' energy systems may not all be connected to each other, but there is one problem that is almost equally important for them all. It is the necessity to take coordinated actions to respond to emergency situations and to establish information sharing mechanisms when an accident occurs.⁷⁶ Unilateral gas and electricity supply cuts within an interdependent energy system negatively affects the availability of energy to meet population and economic

⁷⁶ Commonwealth of Independent States Executive Committee, *44th Meeting of the CIS Electric Power Council Took Place on November 1, 2013* (Minsk: Commonwealth of Independent States, 2013), accessed June 7, 2014, <http://www.cis.minsk.by/news.php?id=2252>.

needs. The CIS countries signed an agreement on mutual assistance in cases of accidents and other emergency situations at electric power facilities on May 30, 2002. Unfortunately, the CIS lacks an enforcement mechanism to encourage and, if necessary, force its member states to comply with terms of the agreement.

Lack of Regional Enforcement Mechanism

One of the main drawbacks of quite an impressive conceptual basis of the CIS is the fact that most of signed intergovernmental agreements are not binding in nature. Recommendation-type agreements require signing additional documents with a detailed action plan. However, turning recommendations or general guidelines into documents forcing/encouraging states to comply with terms of agreements has proved to be quite challenging. With almost no success in strengthening regional energy integration, the CIS has been ascribing some bilateral cooperation to its merits. CIS countries approved the framework program for cooperation to develop nuclear power.⁷⁷ Within this framework, “Rosatom” and “Kazatomprom” signed a memorandum on May 29, 2014 regarding cooperation in the construction of the first Kazakhstani nuclear power plant using Russian reactors with the capacity ranging from 300 MW up to 1200 MW.⁷⁸ It was presented as one of the many achievements of the organization. Development of hydro-power potential of Kyrgyzstan is also to a certain extent ascribed to the fruitful cooperation within the CIS. Kyrgyzstan has prioritized construction of Kamabarata–1 and –2 HPP with total capacity of 2260 MW. First aggregate of Kambarata–2 was put into operation in 2010 with the capacity of

⁷⁷ Commonwealth of Independent States Executive Committee, *Results for the last 20 years and Objectives for the Future* (Minsk: Commonwealth of Independent States, 2011), accessed June 15, 2014, <http://www.cis.minsk.by/news.php?id=289>.

⁷⁸ State Committee of the CIS Member States, *Rossiia i Kazaxstan v Blijayshee Vremya Podpishut Soglashenie o Stroitelstve v Kazaxskom Gorode Kurchatov Atomnoy Elektrostancii (Russia and Kazakhstan will Sign an Agreement to Build in the Near Future Nuclear Power Plant in the City of Kurchatov in Kazakhstan)* (2014), accessed June 20, 2014, <http://sng-atom.com/?q=node/448>.

120 MW. In 2012, the Russian company “Inter RAO UES” signed agreement with Kyrgyzstan on the terms of Kambarata–1 HPP construction. The construction process was expected to start by 2013, but due to political and financial constraints, it is still in the negotiation stage. The governments of Russia and Kyrgyzstan also signed a set of agreements on further exploitation of the Upper Narin cascade HPPs (Akbulun HPP, Naryn HPP–1, Naryn HPP–2, and Naryn HPP–3).⁷⁹ However, to the question of whether the above-mentioned projects could have been agreed upon and implemented without the CIS, the answer is probably “yes.” While those projects with a low probability of success would not have been realized even through the CIS governance mechanism, projects that have a high chance of realization on the bilateral basis are presented as a consequence of cooperation within the CIS framework.

Limited Financial Capabilities

During the period in between 1961 and 1985, the former USSR put online from 8 to 12 GW of new generation capacities annually.⁸⁰ After the break down of the Union, however, newly independent states have been annually introducing new power generation capacities in average 3 times less than in the Soviet years. Underfinancing was rated the main reasons for such a decline. Every member state brings to the table of negotiations what concerns them most. During Tajikistan’s CIS chairpersonship in 2011, for instance, the government emphasized the need for realization of first priority projects such as establishing common energy space, restoring parallel operation of the countries’ electric power systems and development of single mechanism of electricity transit across the territories of the CIS member states.⁸¹ With a limited budget, the CIS

⁷⁹ Commonwealth of Independent States, “On Development of Cooperation.”

⁸⁰ Ibid.

⁸¹ Commonwealth of Independent States Executive Committee, *Koncepciya Predstavitelstva Respubliki Tadjikistan v Sodruzestve Nezavisimix Gosudarstv (The Concept of Republic of Tajikistan’s Chairmanship in the*

could not even support these investment projects. While there were to some extent political reasons involved, most of the agencies within the CIS enlist underfinancing as the main challenge preventing timely and effective realization of projects promoted by the councils of oil and gas and power sectors.⁸²

To sum up, despite the fact that the CIS has developed a comprehensive conceptual framework for the development of regional-level energy projects, it lacks an effective enforcement mechanism. Underfinancing is a constant and a very serious obstacle for the organization to positively respond to member states' requests on maintaining and improving regional energy infrastructure facilities. Similar to other intergovernmental multilateral institutions such as the SCO and the CU/EEU, the CIS ascribes to itself the merits of any signed bilateral agreements and implemented projects. At the same time, however, 20 years of activity within the CIS was a good experience for other integration processes in the region such as the EurAsEC, the CU and the EEU to strengthen their activity.

The World Bank Promoted Regional Energy Governance Projects

The World Bank is one of the main contributors to the set of projects designed to improve the level of energy security, promote energy led economic growth, and address water-energy nexus problems in Central Asia. The World Bank has been co-chairing and partnering with a wide range of multilateral institutions in promoting and implementing energy projects on the local, national, and regional levels in the region. Some major World Bank's large-scale Central

Commonwealth of Independent States in 2011) (Minsk: Commonwealth of Independent States, 2011), accessed June 25, 2014, <http://www.cis.minsk.by/page.php?id=18743>.

⁸² Commonwealth of Independent States Executive Committee, *Informaciya o Reshenii Nekotorix Voprosov, Negativno Vliyayushix na Mnogostoronnee Torgovo-Ekonomicheskoe Sotrudnichestvo v Ramkax SNG (Information of Solving Some Issues Negatively Affecting Multilevel Trade Cooperation within the CIS)* (Minsk: Commonwealth of Independent States, n.d), accessed June 20, 2014, <http://www.cis.minsk.by/page.php?id=408>.

Asian energy sector development initiatives are: the CAEWDP; CASA-1000; and, the assessment studies for the Proposed Rogun Hydro-power Project in Tajikistan.

Main World Bank Programs in the Energy Sector in Central Asia

According to Saroj Kumar Jha, regional director for Central Asia, the World Bank is currently supporting thirty-two country-specific investment projects in energy and water sectors in Central Asia.⁸³ Some of these projects have regional significance. The CAEWDP is one of those World Bank initiatives designed to not only improve water management and development of hydro-power potential, but also promote regional cooperation in the energy sector.

The CAEWDP was a four-year project from January 2010 to January 2014, co-financed by the World Bank and national governments of Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan.⁸⁴ It had three pillars of activity.

- Energy Development—to promote the highest value energy investments and their management. Areas of focus include: infrastructure planning, winter energy security, energy trade, energy accountability, and institutional development;
- Energy-Water Linkages—to improve the understanding of linkages between water and energy at the national and regional levels. Areas of focus include: energy-water modelling, regional hydrometeorology, climate vulnerability, and energy-water dialogue;
- Water Productivity—to enhance the productivity and efficiency of water use in both agriculture and energy sectors.⁸⁵

⁸³ World Bank, “Q&A with Saroj Kumar Jha, Regional Director for Central Asia, On the Current Status of the Rogun Assessment Studies” *Speech, Third Riparian Meetings on Rogun Assessment Studies*, August 12, 2012.

⁸⁴ World Bank, *Central Asia Energy-Water Development Program* (Washington, DC: World Bank, 2013), accessed May 5, 2014, <http://www.worldbank.org/en/region/eca/brief/caewdp>.

⁸⁵ World Bank Group, *Central Asia Energy-Water Development Program* (Washington, DC: World Bank, n.d), accessed May 10, 2014,

The World Bank initiated this program to “improve diagnostics and analytical tools to support the countries of the region in well-informed decision-making to manage their water and energy resources, strengthen regional institutions, and stimulate investments.”⁸⁶ One of the World Bank’s recent initiatives was to establish a network of institutions to promote an exchange of experiences and equip state agencies, civil society, and other relevant institutions with the skills necessary to address water, energy and climate change-related issues.⁸⁷

Since 2007 the World Bank has been facilitating extensive consultations with governments of Kazakhstan, Kyrgyz Republic, Tajikistan, Uzbekistan, Turkmenistan, and Afghanistan to ensure riparian views and concerns are taken into account in the terms of reference for the assessment studies of the Rogun Hydro-power Project in Tajikistan: Techno-Economic Assessment Study (TEAS); and, Environmental and Social Impact Assessment.⁸⁸ Consultations were also undertaken with civil society and representatives of potentially affected communities in Tajikistan. To raise its credibility among Central Asian downstream countries, the World Bank succeeded to reach an agreement with the government of Tajikistan according to which starting from 2010 no new construction would commence until assessments are completed and communicated to the representatives of all countries involved.⁸⁹

Upstream Kyrgyzstan and Tajikistan have a surplus of hydroelectricity production in the summer period. When Uzbekistan withdrew from the CAPS and cut the electricity import in the

<http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/ECAEXT/0,,contentMDK:22743346~pagePK:146736~piPK:146830~theSitePK:258599,00.html>.

⁸⁶ Ibid.

⁸⁷ World Bank, *Central Asia Regional Workshop on Environment and Climate Change: Learning, Partnerships, And Knowledge Exchange* (Washington, DC: World Bank, 2013), accessed May 1, 2014, <http://www.worldbank.org/en/news/press-release/2013/01/24/central-asia-workshop-environment-climate-change>.

⁸⁸ World Bank, *Final Reports Related to the Proposed Rogun HPP* (Washington, DC: World Bank, 2014), accessed November 5, 2014, <http://www.worldbank.org/en/country/tajikistan/brief/final-reports-related-to-the-proposed-rogun-hpp>.

⁸⁹ World Bank, *Assessment studies for Proposed Rogun Hydropower Project in Tajikistan* (Washington, DC: World Bank, 2014), accessed November 6, 2014, <http://www.worldbank.org/en/region/eca/brief/rogun-assessment-studies>.

absence of other exporting options upstream states were forced to spill water. To somehow facilitate energy export-led economic growth of these countries, the World Bank started actively promoting the CASAREM initiative to move the extra-generated electricity from Central Asian upstream countries to South Asian energy markets. As a first phase of the initiative, it was decided to concentrate on CASA-1000 transmission lines to transit 1,300 MW of electricity.⁹⁰ At 1,222 km long, running through Kyrgyzstan, Tajikistan, Afghanistan and Pakistan (PS Datka (Kyrgyzstan) – PS Khujant (Tajikistan) – Rogun HPP (Tajikistan) – Kabul – Peshawar), the line includes: 500 kV DC line 750 km long through Tajikistan (117 km) – Afghanistan (562 km) – Pakistan (71 km); 500 kV AC line through Kyrgyzstan (substation Datka, 452 km) – Tajikistan (PS Khujant, 20 km). With a total length of 472 km, CASA-1000 is supposed to link regional electricity producers with southern energy markets.⁹¹

All three projects are closely interlinked. Improving the livelihood of people in Central Asia, through the development of upstream countries' hydro-power potential, export-led economic growth and energy security, was chosen to be a priority in the World Bank's activity in energy sector in Central Asia. Construction of giant HPPs will largely be justified only in combination with the possibility to export electricity to external markets. Moreover, according to the World Bank and the CAREC reports, development of the Rogun and Kambarata dams will strengthen water management in the region.

⁹⁰ World Bank, *World—Central Asia South Asia Electricity Transmission and Trade Project (CASA 1000)* (Washington, DC: World Bank, 2012), accessed May 5, 2014, <http://documents.worldbank.org/curated/en/2012/06/16435491/world-central-asia-south-asia-electricity-transmission-trade-project-casa-1000>.

⁹¹ World Bank, *CASA-1000 Project Risk Assessment* (Washington, DC: World Bank, n.d), accessed May 7, 2014, <http://www.worldbank.org/content/dam/Worldbank/document/eca/central-asia/CASA-1000-Project-Risk-Assessment-en.pdf>.

The World Bank's Contribution to Addressing Regional-level Energy Security Challenges

Stability of water and energy supplies within the Central Asian region was ensured by a resource-sharing mechanism developed during the Soviet era. This mechanism turned the whole region into a system of interdependent entities. When the Soviet scientists and engineers designed the system, they did not take into account national borders of the Central Asian states. Rational use of resources was the main objective. Central Asian upstream states of Tajikistan and Kyrgyzstan released water and electricity in exchange for electricity and hydrocarbons from downstream countries. However, this resource-sharing mechanism could not withstand current geopolitical realms. The incompatibility of the energy policies with the development of regional cooperation is negatively affecting the security of the CAES and causing shortages of energy and irrational uses of water and energy resources in the region. Acknowledging the seriousness of the problem, regional state actors still fail to achieve a solution amenable to all. Fundamental disagreement between the region's water demand for irrigation and the use of water for HPPs have led to a latent conflict between upstream and downstream countries. Being guided by the belief that the CAES insecurity cannot be solved without first addressing factors affecting water-energy balance in the region, the World Bank has decided to make water-energy nexus issues a priority in its activity in the region.

There are two main projects capable of having impact on the water-energy balance in the region: Rogun and Kambarata-1. Disintegration process of the CAES forced Kyrgyzstan to search for energy supplies from Russia and Kazakhstan and develop coal-fired TPPs to meet its growing energy needs. Completely isolated from outside world and having experienced significant shortage of energy, the Tajik government turned Rogun, the highest HPP in the

world, into a strategically important national project, with the hope and expectation that it will help country get out of energy crisis.⁹²

Between 1963 and 1978, Soviet scientists and engineers in Tashkent (Uzbekistan) conducted assessment studies of the Rogun dam. They revised the studies in 1981. The main objective for building Rogun was to improve water regulation for irrigation in Uzbekistan and Turkmenistan as well as an electricity supply for Central Asia. The construction started in 1982.⁹³ After the collapse of the Soviet Union, however, financing the construction from Tashkent and Moscow stopped. Devastated by the civil war that occurred in Tajikistan after gaining its independence and the breakdown of the Soviet economic system, the Tajik government could not afford to continue building the dam on its own. In 1993, a mud flood significantly damaged the dam. The project was stalled until Tajik authorities decided to restart it to meet its growing energy needs. Construction of the facility occurred on a trans-boundary river with potential consequences for water withdrawal, and in the absence of the supra-national body (Moscow), negotiations with downstream countries were necessary. Once designed in Uzbekistan by mostly Uzbek scientists, this project, ironically, faced serious criticism and confrontation from Uzbek authorities.⁹⁴

In 2010 an inspection request was sent to the Executive Secretary of the Inspection Panel by representatives of the Ecological Movement of Uzbekistan, “Ecoforum – Civil Society,” the deputy of the Parliament and one hundred NGOs. They wanted the inspection committee to assess the social, ecological, and humanitarian impact of the Rogun HPP on riparian states. The

⁹² Dagikhudo Dagiev, Personal Interview, Research Associate at the Institute of Ismaili Studies in London, Astana, Kazakhstan, May 25, 2014.

⁹³ World Bank, “Environment and Social Impact Assessment for Rogun Hydro Power Plant, Environmental and Social Impacts” (V Round of Dialogue, Almaty, Kazakhstan, July 14, 2014).

⁹⁴ Sami Sharif Hamid, Personal Conversation, Director, the Directorate of the Flooding Area of Rogun HPP of the Republic of Tajikistan, Almaty, Kazakhstan, July 15, 2014.

very same arguments, put forward by the ecological movement, were used by the government of Uzbekistan before and after the World Bank's independent investigation. Uzbekistan stressed the worst-case scenario by arguing that in the case of dam failure, waves 245–280m high (in the area of Nurek HPP) and 6–7m in Kazakhstan could result in disaster. According to the initial estimations, destruction of six hydroelectric power plants could flood 5 million people in 700 settlements in four countries (Tajikistan, Afghanistan, Uzbekistan and Turkmenistan). Authorities highlighted that over three million people residing in Uzbekistan might be affected by the flooding and turn to the government for assistance and refuge. In addition to reservations that the dam was initially built in the late 1980s and may not meet current [not specified what kind of] standards, the Uzbekistani side is also concerned about the amount of water that could be taken by Tajikistan to fill the dam. Reallocation of water supplies would lead to water shortages for irrigation by 22 percent.⁹⁵ Tajik authorities claim that there is certain amount of water that Tajikistan has been spilling for many years, which is rightfully allocated to it by Protocol 566 and Nukus Declaration. According to the assessments, between 2005 and 2011 Tajikistan has annually spilled 1.2 km³ of water. It is expected that using the water that is rightfully allocated to it will be sufficient to fill Rogun in 16 years without breaking current agreements and practices.⁹⁶

The World Bank shares the Tajik authority's optimism. Having optimistic expectations that there will be no natural disaster capable of destroying the Rogun dam, Tajik authorities are focusing on the positive prospects that this project brings to Tajikistan and the other Central Asian states. The primary objective of Rogun is to generate electricity to meet the needs of

⁹⁵ World Bank, *To Executive Secretary, The Inspection Panel* (Washington, DC: World Bank, 2010), accessed May 10, 2014, http://siteresources.worldbank.org/ECAEXT/Resources/258598-1297718522264/Request_for_Inspection_Eng.pdf.

⁹⁶ World Bank, "Environment and Social Impact Assessment."

Tajikistan. Rogun will significantly increase electricity production capacity of the country, and the surplus of electricity (clean and renewable) will be exported to neighbouring countries. The export revenues can then be spent on thermal electricity and gas purchases from downstream Central Asian states. Rogun will also provide flood routing capacity, and effectively extend the life of Nurek HPP and the Vakhsh cascade by over one hundred years by retaining sediments. Water storage capacity of the dam could improve water flow regulation potential and manage water shortages in dry years.⁹⁷

Unable to resolve contradictions over the construction of the Rogun dam, Central Asian states agreed to move on in the negotiation process only after a panel of an independent experts conducted assessments of economic, environmental, and social impacts. During the fifth and the last round of discussions on the Environment and Social Impact Assessment for the Rogun Hydro-Power Plant, which took place on July 14–19, 2014 in Almaty, experts presented their concluding remarks. After a series of rounds, the World Bank-supported group of experts concluded that the 335m high Rogun dam must be the most economically efficient and with no major impact on people's livelihood and the eco-system of the region. (See Table 26/27)

Tajikistan suffers from a critical shortage of electricity supply in the winter period, during which electricity demand exceeds supply capacity by around 25 percent. Electricity scarcity can be overcome only by introducing additional power generation capacities. Due to a limited fossil fuel reserves and an unfavourable environment to develop either solar or wind energy, the government decided that only further development of hydro-power potential can supply sufficient electricity. Most of the power generation capacities are run-of-river type HPPs. However, low river flows in wintertime affects the level of electricity production in the country. Different from other HPPs, Rogun is designed as a storage-type plant capable of storing enough

⁹⁷ World Bank, "Environment and Social Impact Assessment."

summer water to produce the required electricity in winter period. Without coordinated regulations, however, this may have a major impact on the availability of water for downstream countries' agricultural needs.⁹⁸

If Tajikistan succeeds to attract investments and reinstate the construction process in 2015, 5–6 units of the HPP will start producing electricity in less than five years. The urgent need for the construction of the Rogun dam is justified by the fact that building HPPs in between the Rogun and Nurek dams is impossible until Rogun is put into operation. For instance, the proposed Shurob HPP with the capacity of 850 MW cannot be built without Rogun.⁹⁹

Table 26: Summary of Technical and Economic Assessment Studies for Rogun dam: Key Data¹⁰⁰

Key Parameters	FSL1290	FSL1255	FSL 1220
Dam Height [m]	335	300	265
Reservoir active storage [hm ³]	10,300	6,450	3,930
Area at FSL [km ²]	170	114	68
Filling period [yr]	16	13	9
Minimal operating lifetime [yr]	115	75	45
Annual average cascade [TW]	34.4, 34.3, 34.1	32.5, 32.4, 32.2	30.2, 30.1, 29.8

Table 27: Summary of Environmental and Social Impact Assessment Studies for Rogun dam: Key Data¹⁰¹

Key Parameters	FSL 1290	FSL 1255	FSL 1220
Summer flow Amu Darya Intended Operation [km ³]	37.4	37.4	37.4
Summer flow Amu Darya Maximizing winter energy [km ³]	30.0	30.9	33.5
Resettlement # Villages	77	36	25
Resettlement # Households	6035	2433	1825
Resettlement # Persons	42,000	18,000	13,000

⁹⁸ World Bank, "Analysis of Alternatives."

⁹⁹ Ibid.

¹⁰⁰ World Bank, *Report on the 5th Riparian Information-Sharing and Consultation Process on the Assessment Studies of a Proposed Rogun Hydropower Project* (Washington, DC: World Bank, June 16 – July 29, 2014), accessed December 8, 2014, http://www.worldbank.org/content/dam/Worldbank/document/eca/central-asia/Rogun%20Assessment%20studies%20Fifth%20Consultation%20Report_eng.pdf.

¹⁰¹ World Bank, *Report on the 5th Riparian Information-Sharing and Consultation Process*.

Since Uzbek authorities consider CASA–1000 and Rogun interlinked, they oppose these projects. Despite the fact that both the government of Tajikistan and the World Bank has presented the advantages of building Rogun, Uzbekistan has made it clear that it perceives the project as a national security threat to the country. Furthermore, even though it is argued that the CASA–1000 and Rogun projects are not linked¹⁰² by looking at the route of transmission lines, which pass along the Rogun HPP,¹⁰³ one may conclude that the electricity generated in this plant will be used for export.

There is currently a surplus of electricity production in Tajikistan and Kyrgyzstan in the summer period, and it is assumed that CASA–1000 will transport this extra electricity to southern neighbours. However, Afghanistan and Pakistan are mostly in need of electricity import in winter and the only projects that provide these opportunities are Rogun and Kambarata–1.¹⁰⁴ In this sense, following the policy of other Central Asian producers, Tajikistan and Kyrgyzstan will increase exports of electricity even at the expense of domestic consumption. Desire to export electricity in wintertime will make Rogun and Kambarata–1 economically attractive, but with limited contribution to energy security projects.

The final reports were released on July 2014.¹⁰⁵ According to the assessment, the highest (335m) possible option of the dam was found the most economically efficient. Both Tajik government and potential investors approved. The assessment, however, did not bring expected results. Uzbekistan is still opposing the dam, arguing that while an assessment has been conducted in the area of the upper Amu Darya River, it did not take into account possible

¹⁰² World Bank, “Q&A with Saroj Kumar Jha.”

¹⁰³ World Bank, “CASA-1000 Project Risk Assessment.”

¹⁰⁴ President of the Republic of Tajikistan, *The Annual Message to the Majlisi Oli of the Republic of Tajikistan* (Dushanbe: President of the Republic of Tajikistan, 2011), accessed June 5, 2014, <http://www.prezident.tj/en/node/2189>.

¹⁰⁵ World Bank, *Report on the 5th Riparian Information-Sharing and Consultation Process*.

consequences for downstream Central Asian countries, especially Uzbekistan. The World Bank, which has spent hundreds of millions of dollars on the assessment of the Rogun dam, arrived at the similar conclusions as the designers of the dam 40 years ago. Uzbek political scientist Tolipov asked whether the Uzbek government would comply with the result of independent investigations if it concludes that Rogun does not pose a threat to downstream countries? And, in addition Tolipov asked, how would the Tajik government continue construction of Rogun in the case of World Bank approval and continued Uzbek government opposition?¹⁰⁶ What the Central Asian countries now have is the same opposing the project Uzbek government and limited opportunities for Tajik authorities. These results could of course be used if anyone decides to get involved in building the dam, but security risks over the project imply that such engagement would entail unacceptable conditions for Tajikistan. As it stands right now the World Bank efforts to bring Central Asian states closer to the resolution of the conflict failed, since there has been progress on neither CASA-1000 nor Rogun.

The Regional Environmental Center for Central Asia

The environmental dimension of energy security suggests that Central Asian countries should enjoy not only sufficient and uninterrupted, but also clean and sustainable supplies of energy. Brown economies and highly inefficient energy sectors of the Central Asian states indicate that this aspect of energy security requires urgent attention. Having placed strategic interest in fossil fuels, Central Asian governments pooled their efforts and allocated their resources to the development of this particular part of the energy sector. Thus, projects designed to develop of RES and reduce greenhouse gas emissions remain underinvested. One of the main

¹⁰⁶ Farkhod Tolipov, Personal Interview, Director of Bylim Karvoni Non-governmental Research and Training Center, Tashkent, Uzbekistan, June 29, 2013.

regional governance innovations designed to promote the environmental dimension of energy security is the Regional Environmental Center for Central Asia (CAREC centre).

The CAREC centre was established in 2001 by founding members Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, as well as the UNDP and the European Commission.¹⁰⁷ The head office of the CAREC centre is located in Almaty, Kazakhstan. Country offices operate in all five Central Asian states. The idea behind establishing the CAREC centre was to promote multi-sector cooperation in addressing environmental problems in Central Asia at the local, national and regional levels. The main areas of activity of the centre in the energy sector include: (a) supporting programs and initiatives on the reduction of greenhouse gas emissions in Central Asia; (b) assisting in implementation of Kyoto protocol; (c) increasing the use of renewable energy; and (d) enhancing energy efficiency in Central Asia.¹⁰⁸ The CAREC centre has successfully brought some experts from the region to share their understanding of certain regional-level problems and prospects in addressing these challenges within the following programs: Environmental Management Program; Education for Sustainable Development; Water Initiatives Support; Climate Change and Sustainable Energy; and Inter-program Activity.¹⁰⁹ However, there is little evidence pointing to the fact that this knowledge sharing leads to large-scale practical changes in the energy sectors of the Central Asian countries.

The CAREC centre pursues three main objectives: (a) establishing inter-sectoral dialogue; (b) attracting advanced knowledge and technologies by creating necessary opportunities; and (c) promoting governance mechanisms by increasing the role of non-state

¹⁰⁷ Regional Environmental Centre for Central Asia, *About CAREC* (Almaty, n.d), accessed April 5, 2014, <http://www.carecnet.org/about-carec/?lang=en>.

¹⁰⁸ Regional Environmental Centre for Central Asia, *Climate Change and Sustainable Energy* (n.d), accessed April 10, 2014, <http://www.carecnet.org/programmes-and-activities/climate-change-and-sustainable-energy/?lang=en>.

¹⁰⁹ Regional Environmental Centre for Central Asia, *Programmes* (n.d), accessed April 5, 2014, <http://www.carecnet.org/programmes-and-activities/?lang=en>.

institutions in general and civil society organizations by providing conditions for environmental protection and sustainable development of the region. Obviously, practical implementation of energy projects in the form of building facilities and establishing energy supply networks is not the primary objective of this particular institution. It is the practical changes in Central Asian countries' energy sectors that the governments and more importantly people want to achieve. Governance initiatives in Central Asia fail in actively engaging civil society organizations into strategically important energy sectors.¹¹⁰

Central Asian Initiative on Sustainable Development

The decision to establish a sub-regional partnership to strengthen cooperative dynamics was made during the ministerial meeting of the Central Asian countries in Almaty in 2001. The Central Asian Initiative on Sustainable Development (CAI) within the CAREC centre was established as a regional platform designed to promote cooperation and partnership between Central Asian countries in the field of environmental protection.¹¹¹ There are several priority areas of the CAI focusing on some vulnerable aspects of energy security in the region, such as enhancement of environmental management, strengthening of the civil society's role, promotion of education for sustainable development, ensuring coordinated water resources management, sustainable energy development and promotion of environmentally sustainable livelihood.¹¹²

One of the main goals of the CAREC centre is to improve awareness among experts within the Central Asian countries on how to ensure sustainability of energy sector by introducing environmentally-friendly policy initiatives. The "Climate Change and Sustainable

¹¹⁰ Alexey Yusupov, Personal Interview, Friedrich Ebert Foundation Head of Office Almaty, Almaty, Kazakhstan, October 15, 2013.

¹¹¹ Regional Environmental Centre for Central Asia, *Central Asian Initiative on SD*, (n.d), accessed April 20, 2014, <http://www.carecnet.org/international-processes/central-asian-initiative-on-sd/?lang=en>.

¹¹² Regional Environmental Centre for Central Asia, *CAREC's Key Contributions* (Almaty, n.d), accessed April 25, 2014, <http://www.carecnet.org/about-carec/carec's-key-contributions/?lang=en>.

Energy” program was designed to contribute to increasing the level of RES in the overall energy balance, improve energy efficiency and reduce emissions of greenhouse gases in Central Asian countries. The CAREC centre conducted a survey among experts within Central Asian countries to identify main challenges along the way toward increasing energy efficiency and RES within “The Gap Analysis in the Area of Climate Change and Energy Efficiency in Central Asia” project.¹¹³ Central Asian experts within the “Planning for Energy Security and Sustainability in Central Asia” project reviewed energy-environment nexus problems and identified the main energy security threats in the region. Based on the assessment of the environmental dimension of energy security challenges, experts developed scenarios for the sustainable development of the region.¹¹⁴ According to the survey and the developed scenarios, Central Asian countries acknowledge the seriousness of the environmental damage caused by their economies and energy policies. It is, however, difficult to establish cause and affect linkage between the above-mentioned projects and infrastructure construction and modernization of energy facilities. Regional Environmental Centers do not possess sufficient funds to build energy facilities on their own. The CAREC centre, however, focuses on communicating the results of studies through training experts and decision makers, with the aim that this education will have an impact toward building energy facilities and investing in energy efficiency.

Within the project on “Promoting Adaption and Mitigation Strategies on Climate Change in Central Asia,” Central Asian experts were trained so that they share common understanding

¹¹³ Regional Environmental Centre for Central Asia, *Gap Analysis in the Area of Climate Change and Energy Efficiency in Central Asia*, (n.d), accessed April 25, 2014, <http://www.carecnet.org/programmes-and-activities/climate-change-and-sustainable-energy/gap-analysis-in-the-area-of-climate-change-and-sustainable-energy/?lang=en>.

¹¹⁴ Regional Environmental Centre for Central Asia, *Planning for Energy Security and Sustainability in Central Asia* (n.d), accessed June 15, 2014, <http://www.carecnet.org/programmes-and-activities/climate-change-and-sustainable-energy/planning-for-energy-security-and-sustainability-in-central-asia-envsec-1-and-2/?lang=en>.

over how to address environmental challenges.¹¹⁵ The CAREC centre organized several workshops related to international climate negotiation procedures and necessary measures to promote coordinated climate change adaptation initiatives.¹¹⁶ During these workshops, national experts and government officials together with representatives of multilateral institutions reviewed strategies of the Central Asian countries of promoting of RES, energy efficiency and adaptation measures to climate change.¹¹⁷ The idea behind organizing such workshops is to encourage experts to come up with a set of recommendations concerning policy options to address the impact of climate change on availability of energy resources and promotion of RES in the energy balance of the region.¹¹⁸

One of the biggest drawbacks of this particular regional governance mechanism is the fact that it is limited to gathering experts and writing reports. As an output, the CAREC centre provides recommendations with no enforcement mechanism to implement suggested measures. When the results are communicated to the governmental bodies responsible for the promotion of sustainable energy development initiatives, they accept the proposals, but highlight that their respective countries cannot afford a large scale economic, social and energy sectors reform.¹¹⁹ Moreover, some of the projects within the CAI failed to engage Uzbekistan. Without Uzbekistan,

¹¹⁵ Regional Environmental Centre for Central Asia, *Integrated Approach for the Development of Low Carbon Development Strategies in Central Asia* (n.d), accessed June 10, 2014, <http://www.carecnet.org/programmes-and-activities/climate-change-and-sustainable-energy/integrated-approach-for-the-development-of-low-carbon-development-strategies-in-central-asia/?lang=en>.

¹¹⁶ Regional Environmental Centre for Central Asia, *Workshop on Emissions Trading System in Kazakhstan* (n.d), accessed June 10, 2014, <http://www.carecnet.org/programmes-and-activities/climate-change-and-sustainable-energy/workshop-on-emissions-trading-system-in-kazakhstan/?lang=en>.

¹¹⁷ Regional Environmental Centre for Central Asia, *Promoting Adaption and Mitigation Strategies on Climate Change in Central Asia* (n.d), accessed June 5, 2014, <http://www.carecnet.org/programmes-and-activities/climate-change-and-sustainable-energy/promotion-of-mitigation-and-adaptation-strategies-on-climate-change-in-central-asi/?lang=en>.

¹¹⁸ Regional Environmental Centre for Central Asia, *Capacity Building for Scenario Development: Climate Change and Water-Food-Energy Security in Central Asia* (n.d), accessed April 15, 2014, <http://www.carecnet.org/programmes-and-activities/climate-change-and-sustainable-energy/capacity-building-for-scenario-development-climate-change-and-water-food-energy-security-in-central-asia/?lang=en>.

¹¹⁹ Petr Svoik, Personal Interview, Engineer and Expert on Energy Sector Development in Kazakhstan, Almaty, Kazakhstan.

a key actor in addressing issues that the CAI set as its priority areas of activity, it will be difficult for the CAREC centre to develop a common strategy on addressing energy security challenges to bring significant changes. According to Almaz Akhmetov, an expert on sustainable development and RES initiatives in Kazakhstan within the CAREC centre, except for climate-change related issues and issues regarding cooperation in the energy sector, energy security concerns that bear regional importance and water-energy balance are excluded from the agenda.¹²⁰ Since regional-level initiatives are often perceived by governmental representatives to be politically sensitive, most of the projects are limited to local- and country-level initiatives.

Concluding Remarks

One of the biggest challenges preventing timely resolution of disagreements over water withdrawal and energy supply balance between upstream and downstream Central Asian countries was the lack of effective regional governance mechanisms capable of forcing or encourage actors in the energy sector to coordinate their actions and address energy security challenges. Intergovernmental agreement between Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan on using water-energy resources of the Syr Darya basin intended for multilateral contracts on exchanging water and electricity for gas and coal. However, starting from 2008 Uzbekistan has only been signing bilateral agreements.¹²¹ During 2013, Kyrgyzstan initiated a number of meetings between Central Asian upstream and downstream countries to discuss the technical parameters of Kambarata–1 HPP. Uzbekistani representatives had always been invited,

¹²⁰ Almaz Akhmetov, Expert at Regional Environmental Center of Central Asia, Skype Interview, July 26, 2013.

¹²¹ “Kirgiziya Virazila Sojalenie, Chto Uzbekistan ne Jelaet Sotrudnichat v Voprosax Stroitelstva GES (Kyrgyzstan Regrets that Uzbekistan is not Willing to Cooperate in Building HPP),” *Regnum*, February 5, 2013, accessed June 10, 2014, <http://www.regnum.ru/news/1621466.html#ixzz2vXzxCrn>.

but never accepted the invitation.¹²² This indicates the extent of politicization of water-energy nexus in Central Asia.¹²³ None of the above studied regional-level energy governance platforms succeeded to actively engage either Uzbekistan or Turkmenistan in collectively addressing energy security challenges. Events in which Uzbek representatives participate often exclude topics related to water-energy disputes in the region.

When economic gains or personal profits are placed above energy security concerns, at least for the Central Asian countries, counting on intergovernmental institutions, which claim to promote cooperation in the energy sector for the benefits of all, may not bring the expected results. There are governance innovations in the form of specifically-designed mechanisms to promote energy security. While some of these mechanisms aim to change the way actors perceive energy security challenges, such as Central Asian Regional Environmental Centers, others are more practical and results oriented. The CAREC has the largest number of energy projects practically implemented in Central Asia, including those promoted within the Central Asian Energy Strategy for Regional Cooperation. However, how can energy sector projects that are implemented within the CAREC and budgeted US\$4 billion over two decades compete with US\$50 billion energy investment package made by the Chinese President in just one visit?

The above-mentioned energy governance innovations succeeded to establish a comprehensive conceptual framework and institutional apparatus to promote regional cooperation in the energy sector. However, the fact that intra-Central Asian energy cooperation has been declining over the last several years while negatively affecting the level of energy

“MID Kirgizii: Uzbekistan ne Zaxotel Uchastvovat v Obsujdenii Proektov Kirtizskix GES (MoFA of Kyrgyzstan: Uzbekistan did Want to Participate in the Discussion of the HPP Projects of Kyrgyzstan),” *Regnum*, October 18, 2013, accessed September 20, 2014, <http://www.regnum.ru/news/1721689.html#ixzz2vWqv1oyC>.

¹²³ Sherzod Mukhammadiev, Personal Interview, Ministry of Agriculture of the Republic of Uzbekistan, Tashkent, Uzbekistan, June 23, 2013.

security in the region indicates that existing mechanisms are entirely not capable of ensuring security of the CAES.

This analysis shows that the regional platforms lack an effective enforcement mechanism to implement terms of agreements and ensure full-scale realization of regional-level projects in the energy sector. None of the existing governance mechanisms is specifically designed to improve energy security through facilitating intra-Central Asian cooperation. Development of cooperation within the proposed five corridors is negatively affecting energy trade within Central Asia. Different perceptions of energy security by the energy sector governors are leading to policies that distance Central Asian states from each other, which turns to be a major obstacle for establishing a common energy market. Even though the name of the programs and institutions contain “Central Asia” it mainly represents a geographical scope within which various projects in the energy sector are implemented. Most of the initiatives’ practical contribution, however, is limited to country- and local-level energy projects. Those projects limited in number that successfully engage representatives of several Central Asian states or deal with regional-level problems end up providing recommendations only.

CONCLUSION

Energy sectors of the Central Asian countries were designed to operate within the CAES irrespective of national borders. Coordinated operation of the Central Asian electric power grids and gas pipeline networks within the framework of the resource-sharing mechanism not only ensured stability and reliability of energy supplies, but also provided conditions for using energy resources in the most rational way. However, recent transformation of the CAES, in which intra-Central Asian energy cooperation is no longer a priority, has negatively affected the level of energy security in the region. In the trade-off between pursuing establishing independent energy systems and strengthening regional cooperation in the energy sector, regional state actors decided to give preference to the former. While there are a number of domestic as well as foreign factors affecting the decision-making process, the analysis shows that a transition to a completely independent energy system requires sustaining regional energy trade for at least the short- to medium-term. It has also become clear that without properly functioning regional-level energy governance innovations, strengthening and sustaining energy cooperation within the CAES will be a difficult task to accomplish.

A long history of cooperation, inherited energy infrastructure, interdependence, and complementarity of energy sectors suggest that strengthening intra-regional energy cooperation will improve security of the CAES, and even more important in this context, is that it will do so in the most cost-efficient way. There are, however, several external as well as domestic obstacles preventing regional state actors from engaging in a more dynamic and cooperative energy trade. Energy-thirsty regional and global customers perceive Central Asia as a source of energy and promote projects to move energy out of the region, thus threatening availability of sufficient resources for domestic and intraregional consumption. While these actors support stability in the

region, they may not be interested in an integrated Central Asia that is capable of dictating its own terms. Power asymmetry in favour of external customers may force regional energy producers to act in a way that may sometimes affect availability of sufficient energy supplies for both the population and economic needs of the Central Asian republics. And asymmetrical interdependence between Central Asian downstream hydrocarbon producers and upstream consuming states is affecting the availability of sufficient energy supplies for intra-Central Asian needs.

Central Asian policy makers who started prioritizing the strengthening of national energy systems within their respective countries resulted in the irrational use of energy resources, investment in costly energy projects and eventually difficulties to sustain affordable energy prices. Most importantly, despite the fact that Central Asian countries acknowledge the importance of regional energy cooperation and the necessity to establish well-functioning mechanisms to address energy insecurities, there is no effective intra-Central Asian initiative promoting such cooperation. Several energy sector integration initiatives/regional energy governance innovations that are put in place to manage Central Asian energy resources either lack effective enforcement mechanisms or intentionally leave some aspects of the energy sector development (energy security or management of major sources of energy) out of regulations.

Maximally secure CAES requires the establishment of the regional energy governance mechanism which ensures reliability of energy supplies, encourages coordinated actions among actors to respond to energy insecurities, and engages all actors (state and non-state) in strengthening national energy sectors by providing conditions to improve regional energy cooperation. However, currently none of the regional-level energy governance mechanisms successfully draw enough resources to encourage energy actors to use energy resources in the

most rational way and ensure sustainability of energy supplies for both the population and economic needs. In this research work, energy security is defined as a condition that states enjoy when they can be confident they will have adequate and sustainable energy supplies for the population and economic needs for the foreseeable future. Even though the CAES is in the process of disintegration, until Central Asian countries establish independent national energy systems, which are for some of them a long-term goal, regional cooperation in the energy sector remains an important component to ensure security of the CAES. The research also shows that energy security for Central Asian countries in the short-run can be ensured through intra-Central Asian energy trade and coordinated operation of interdependent energy sectors.

Competing Aspects of Energy Cooperation within the CAES

Scholars and Central Asian policy makers have failed to arrive at a shared definition of energy security or at least agree upon key elements of it, because there is often a conflict of interests as a consequence of which one's energy security is promoted at the expense of others or energy security interests are sacrificed for the sake of financial gains, political or economic leverage. Central Asian energy cooperation has three components that are closely interlinked and, due to inappropriate management, sometimes become mutually exclusive.

- (a) *Energy supply security* prioritizes Central Asian countries' availability and affordability of sufficient supplies of energy now and for the foreseeable future.
- (b) *Energy export security* aims at ensuring energy demand (through either long-term contracts or diversification of energy export routes) to generate revenues from selling energy to external markets.

(c) *Water-energy nexus*, a legacy of the Soviet Unified Energy System of Central Asia, based on resource-sharing mechanism that ensures a stable supply of water for irrigation purposes in exchange for energy resources.

Regional and global powers' interest in Central Asian resources has been growing over the past decade. Unfortunately, energy export capacity does not match the volume of gas that the regional producers are taking obligations to supply. Tempted by financial revenues from exporting energy resources, Central Asian producers continue to increase the volume of exported energy even at the expense of domestic consumption needs, as is clearly illustrated in the example of Uzbekistan.

Governments, as key energy policy decision makers, have to balance prioritizing different aspects of energy sector cooperation such as energy security, environmental concerns, economic growth and development, etc. In this sense, while making a decision to improve other aspects of energy sector development, state and non-state actors should keep in mind the importance of energy security concerns.

HPPs' primary goal has shifted from the water mode of operating, which established a well-functioning water management system, into an energy mode, which prioritizes increasing electricity production capacity, thus might affect the water withdrawal and energy supply balance in Central Asia. This has led to serious disagreements between regional state actors resulting in frequent energy supply disruptions and energy trading mechanisms failures.

While all these aspects of energy cooperation should not necessarily be mutually exclusive, the analysis shows that conflict over water distribution and construction of giant HPPs along with increasing the volume of energy export are negatively impacting availability of energy resources for domestic and intra-regional needs.

Changing the Dynamics of the Central Asian Power Balance

Central Asia is not the only region where non-cooperative dynamics between states in the energy sector impact availability of sufficient and stable energy supplies. What distinguishes this region, however, is the fact that initially Central Asian countries' energy sectors were designed to operate within a unified energy system. But intra-regional energy trade within the framework of the resource-sharing mechanism, which ensured stability of energy supplies in Central Asia, is currently being compromised.

Almost complete dependence on the Russian pipeline network to export oil and natural gas has put Central Asian states in a very vulnerable position (low prices for oil and gas, economic dependence, political pressure, etc.). Thus, diversification of energy export routes by building alternative pipeline networks promoted by regional and global energy consumers was supported by Central Asian energy exporters. However, limited energy export capacities along with other economic, geopolitical and security factors have forced Central Asian producers to increase energy exports even at the expense of domestic and intra-Central Asian consumption.

Ups and downs in energy production and consumption, certain progress in the construction of new facilities and the maintenance of existing ones did not significantly affect the power balance among Central Asian states and with Russia throughout 1990s. Yet, it was clear that the CAES has undergone transformation from the condition in which political and economic borders were disregarded into intraregional energy relationships in which states are highly concerned about their sovereignty. In the late 1990s, Turkmenistan started considering development of an independent energy system. Uzbekistan has also been working on strengthening its own national energy system. At that time, however, their energy policies did not imply complete breakdown of the unified CAES.

Having benefitted from re-selling Central Asian resources, Russia had been mostly blocking all energy projects designed to diversify Central Asian countries' energy export dependence on Russia. While Russia was also interested in importing Central Asian energy, it needed these resources only to fulfill its obligations to supply natural gas to the European customers. In such asymmetrical interdependence, Central Asian exporters were forced to comply with game rules set by the Russian government that were rarely in favour of the former. Since the higher the cost of the termination or drastic alteration of energy relations for an actor, the more vulnerable this actor is and Central Asian states left in this more vulnerable position. Currently, the majority of Central Asian energy resources are transported through Russian and Chinese pipelines. However, neither China nor Russia considers Central Asian energy as a vital source for their economy.

So, despite the fact that there are a number of proposed energy projects capable of changing the power distribution in the region, only China has succeeded to significantly challenge the established balance. In 2012, gas export to China and Iran exceeded the volume transported to Russia for the first time. Currently, China is the major importer of gas and, taking into account the projected increase of gas exports in this direction, it will remain the major importer in the future. China is also quite interested in importing electricity from Central Asian upstream countries. In this sense, Central Asian countries in an attempt to escape from extreme dependence on the Russian pipeline network are falling into the same trap of high dependence on China. Further diversification of energy export routes is important for Central Asian states since it can minimize the cost of drastic alteration of energy relations with either China or Russia, but does not necessarily contribute to the level of energy security of the latter.

While in energy export/import relations with external customers Central Asian exporters represent weaker players, in energy supply relations within the region oil and gas producers retain the upper hand. During the Soviet Union and right after its collapse, mutually beneficial resource-sharing mechanisms ensured energy security and contributed to economic stability to some extent. However, the current state of natural resource management in Central Asia can easily be characterized as conflictive. Higher prices for energy paid by external consumers have tempted downstream countries to redirect resources to the outside world and then equate the price for upstream Central Asian countries. Having experienced severe energy shortages to meet the economic and population needs of the country, Tajikistan and Kyrgyzstan have shifted from water to energy mode in operating their HPPs, which is capable of affecting current water withdrawal level in the region. Tajikistan and Kyrgyzstan are now planning to speed up the construction of two giant HPPs to generate more electricity and develop their own fossil fuels to improve the level of energy security by decreasing their dependence on oil and gas as well as thermal electricity coming from downstream neighbours. But the construction of the Rogun and Kambarata dams, perhaps predictably, was critically and sometimes aggressively accepted by Uzbekistan.

The Problem of Hunting a Stag (Maximally Secure Central Asian Energy System)

Central Asian energy sectors were initially designed to operate within a unified energy system turning regional state actors interdependent on each other. Having mutually benefited from cooperation in the energy sector, Central Asian states were supposed to keep bartering/trading energy and sharing resources. During the Soviet Union instructions coming from a supra-national political centre (Moscow) ensured the stability of energy supplies and

coordinated operation of the CAES. Throughout the 1990s, regional state actors continued cooperating in the energy sector by inertia, because there were neither domestic nor external major factors threatening intraregional energy trade in Central Asia. The CAES, however, had later undergone certain internal as well as external transformations, which affected the level of intraregional cooperation in the energy sector consequently leading to energy insecurity.

The analysis of the CAES security shows that there is no individual payoff greater than what actors can achieve through cooperation. In this sense, there should be little incentive for Central Asian states to cheat on each other by simply calculating the payoffs. So the dominant strategy of Central Asian countries' is to choose cooperative dynamics. Regional state actors, however, chose establishing independent energy systems and increasing energy exports to external customers, having perceived it as the most optimal strategy at this particular stage of interaction. Since cooperation in the Central Asian context to improve energy security is always preferred to defection in terms of overall payoffs, regional state actors' failure to ensure coordinated operation of energy sectors can be considered a problem of coordination (the SH) rather than cooperation (the PD).

SH, unlike PD, has a shadow of the future component built in. The SH model has tension between short-term, low-value but high-probability payoff and long-term, high-value but low-probability payoff. In the Central Asian case, governments are concentrating myopically on higher-probability short-term payoffs to the detriment of long-term payoffs (in the form of more robust energy security).

The theory implies that if a stag appears in the beginning of hunting, hunters would most likely go for a stag. If the hunting takes more time, there emerges a risk that someone would defect by being tempted by a hare running through bush. In the Central Asian case, there was no

need for hunters to test their true commitment to the common cause in the prolonged hunting because they have already been benefitting from cooperation and know that they have all preconditions to trust each other.

While security of the CAES is a stag that actors can achieve in case they choose to pursue intra-Central Asian energy cooperation, regional state actors nonetheless started prioritizing establishing independent national energy systems. Turkmenistan had officially withdrawn from the CAPS did not completely suspend energy export/import relations with other Central Asian states until Uzbekistan cut off the unified system. Now Turkmenistan is retaining the status of neutrality by refraining from becoming involved in conflicting water/energy nexus relationships. As a hub of the CAES, Uzbekistan's decision to withdraw from the CAPS and alter the stable gas supply to neighbouring countries seriously affected the level of cooperation, which have led to a different extent to a decreased level of energy security in all five Central Asian states. Guided by the belief of self-sufficiency, Uzbekistan continues to refrain from full-scale reintegration of the CAES, even despite the fact that isolationist energy policy toward neighbouring states is negatively affecting its own energy security. Uzbekistan's decision to withdraw from the common energy system was partly justified by the fact that Central Asian upstream states started expressing a willingness to develop their hydro-power potential through the construction of the giant HPP. The Uzbek government then used its energy leverage as a "weapon" to influence the decision making of its counterparts. Kazakhstan, relying on its financial capabilities, also decided to secure itself from any sort of dependence on unreliable southern partners.

High incentive to hunt a stag and all preconditions for sustaining cooperative dynamics was supposed to prevent state actors from defecting. In the SH game it is always preferable to

hunt a stag under the condition that others hunt it too. And it is better to hunt a hare if other players hunt hares. While each player always had in mind strengthening their energy systems, in fact most of the actors were forced to hunt hares because Uzbekistan preferred a hare to a stag. Decreasing levels of energy security proves the fact that the consequences of the CAES disintegration are more severe than was probably assessed by the Uzbek government and go beyond the scope of the Central Asian upstream countries alone. So basically what was perceived as a mild dilemma (an insignificant difference in terms of payoffs between cooperation and defection), in fact turned to be a severe issue.

Trade-offs between short- and long-term gains seem to be one of the key challenges preventing regional state actors from achieving greater energy security through cooperation. The level of economic and energy sector development as well as the extent of vulnerability to energy security threats differ from country to country in the region. Whereas some enjoy abundance of fossil fuel deposits to meet energy needs, others possess yet underdeveloped extensive hydro-power potential. In this sense, while some need a stag more than others, for some a juicy hare looks more attractive at this stage. This could explain why the CAES, which was based on trust and cooperation to maximize benefits and use energy resources in the most rational way, is in the process of disintegration. Having a history of long-term cooperation in the energy sector, some Central Asian countries decided to deceive each other in an attempt to take maximum advantage of their energy resources by strengthening national energy systems and pursuing independent energy policies.

During the Soviet period, the CAES was operated from Tashkent, but was still controlled by Moscow and it was not the Central Asian states' choice to decide whether to defect or cooperate. Within the water-energy nexus, in which water and energy were considered closely

tied to each other, all Central Asian states enjoyed fair distribution of resources and benefits. Energy supply networks were largely operated within a closed circle with no possibility to export energy other than in the Russian direction, so the regional energy producers were not tempted by hard currency paid by external customers. Currently, however, there is no longer a supra-national body dictating the terms of cooperation. Water and energy sectors are still closely interlinked, but while some actors operate HPPs within an energy mode, others insist on keeping the water mode. On top of that, rapidly increasing external demand for Central Asian energy resources and physical capability to move that energy is a very tempting hare, which regional state actors cannot resist to pursue.

High external market prices for oil and gas in combination with slowly increasing energy production capacity, in addition to the fact that Central Asian countries have succeeded to diversify their dependence on Russia by obtaining access to China, Europe, Iran, and in limited quantities to other markets transformed the CAES in which hydrocarbon producers are incentivized to cheat on Central Asian upstream countries and redirect their export to newly opened energy markets even at the expense of intraregional consumption.

Having justified its defection on regional energy cooperation by low regional prices compared to what was offered by external customers, Uzbekistan succeeded to achieve more favourable terms in the electricity and gas trade. Central Asian upstream countries are now willing to pay a good price for the oil and gas supplied by their downstream neighbours. However, there was another reason, which was perhaps more important, for Uzbekistan to choose non-cooperative dynamics. Uzbekistan also decided to defect to make Central Asian upstream states give up the idea to pursue the construction of giant HPPs capable of affecting the status quo water withdrawal balance, which perfectly suits its interests.

The SH game implies that a hunter who chooses to go for a stag takes a risk that others may choose not to. A hunter who pursues a hare runs no such risk, because his or her payoff does not depend on others. And, hunters have to make a choice between high probability lower selfish gains and low probability higher collective benefits. The pay-off matrix for the hunters (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan) is if they capture the stag (reintegrate CAES). Since Tajikistan was completely isolated from the CAES, when Uzbekistan stopped energy supplies/transit to its upstream neighbour, it is the most obvious winner from taking the stag. Kyrgyzstan is the second big winner. Kyrgyz government succeeded to ensure energy supplies from Kazakhstan directly and with the support of the Russian side as a middleman. The only way to supply thermal electricity and natural gas to the southern parts of the country is through Uzbekistan. Kazakhstan is a weaker winner, because it is financially capable of purchasing both gas and electricity from neighbours as well as increase its own production and transportation capacity. It is still important though for Kazakhstan to sustain regional cooperation in the energy sector because establishing an independent energy system takes time, and it is cost efficient to exploit existing energy supply channels. Turkmenistan has essentially little stake in the CAES right now in terms of physically supplying sufficient amount of energy to meet its domestic needs. Thus, it has basically retrenched from the region to focus on integration into the global energy system. But it can still benefit from intraregional energy trade, which adds clean hydro power to the country's consumption balance and allows its natural gas to be used in a more rational way. Since Turkmenistan is connected to its major energy markets through the Central Asian states, it would want to take part in ensuring transit security throughout the region as part of a greater energy cooperation. For Uzbekistan, the share of the stag now turned to be higher than was expected when it decided to compromise stable energy

supply and transit relationships within the region. And the hare that it was after does not seem as juicy and attractive anymore. The rewards from the CAES will slowly turn in reverse when fossil fuels near their completion and renewable hydro power start having greater importance.

Regional state actors are struggling to equalize the payoffs through greater cooperation in the energy sector, because Central Asian upstream countries gain more in the short run, while downstream countries can only expect to receive higher benefits in the long run. Being unable to coordinate the trade-offs between short- and long-term benefits, Central Asian countries are losing a chance to hunt a stag. Equalizing long-term payoffs is possible under the condition of trust, in which some energy actors would be willing to pay more now, expecting to receive higher benefits in future. Another possibility is to establish relationships with equal amounts of energy contributed by each party. The main goal is to convince all hunters to coordinate and not to defect on the other hunters.

In an environment of uncertainty, where Central Asian governments are no longer sure about the intentions of their neighbours, the best way to encourage actors to cooperate is to improve communication channels. Communication in this sense is a good tool to alleviate the fear of uncertainty and being cheated by others. For the moment, however, communication among Central Asian countries is limited to cheap talks. To encourage regional state actors to communicate more actively and not only with their counterparts, but also with other actors engaged in the Central Asian energy sectors to promote and sustain cooperation within the CAES, several regional-level governance mechanisms were put in place. Unfortunately, the extent of cooperation and, consequently, security of the CAES remains limited suggesting that regional energy governance innovations face serious challenges preventing them from achieving the goal for which they were designed.

The SH game is about the trade-off between low-risk short- and high-risk long-term rewards. The main line of argument in the case of the CAES is that non-cooperative dynamics in the region's energy sector is the result of state actors' desire to pursue immediate gains due to inability to coordinate their actions to achieve greater long-term benefits. This, however, does not undermine the extent of domestic energy sector governance drawbacks and the problem of corruption. Central Asian governments and elites in general, who benefit from natural endowment rents perhaps only care about maximizing short-term profits. Lack of transparency of the region's energy sectors and unaccountability of ruling elites make it possible for elites to fill their pockets from exploiting resources without caring about long-term energy security. Central Asian countries are, to a different extent, authoritarian states in which powerful actors can extract rents without penalty and without concern for the long-term public good. Domestic energy sector mismanagement may overshadow the problem of regional-level cooperation and coordination. Internal governance problems in the region indeed affect the regional-level cooperation in Central Asia. Presumably, if these countries were genuine democracies, and if their energy infrastructures were owned and operated by public agencies for the public benefit, they would be more attuned to long-term energy security concerns. The research has shown that the Central Asian energy sectors are controlled by the ruling elites who have a low level of accountability to the public.

The analysis of the Central Asian energy sector development also indicates that the extent of intra-Central Asian cooperation does not overall threaten the elite's personal profits. Trading energy resources with external customers constitutes the main sources of income for the government in most of the Central Asian states, while subsidized domestic energy markets pose bigger threats. Unless domestic energy sector governance problems are solved, achieving a well-

functioning regional-level energy governance mechanism may be problematic. However, intra-Central Asian trade may contribute to mitigating domestic crisis without compromising revenues from exporting energy to external markets. Besides, regional-level energy governance innovations, introduced to deal with energy security challenges within the region can hypothetically contribute to improving domestic energy sector management. The dissertation makes it clear that there are many regional-level energy governance mechanisms that are not working very well in terms of ensuring security of the CAES. Both the mistrust among regional state actors and the wrong perception of high individual gains that affect regional cooperation, as well as the problem of domestic energy sector mismanagement, have a negative effect on the security of the CAES. But the analysis shows that the inability to coordinate their strategy to achieve a long-term payoff by ensuring security of the CAES determines the regional state actors' desire to pursue short-term gains in the form of strengthening their national energy systems.

Attributes of a Maximally Secure Central Asian Energy System

This research shows that there are several key attributes of a maximally secure CAES that should be prioritized in addressing energy security challenges in the region. Central Asian countries cannot ensure their energy security, at least in the short- and medium-term, without restoring and sustaining energy trade among each other, since all external actors are interested and have successfully implemented projects designed to move energy resources out of the region. Using energy resources rationally would be possible only through intraregional energy trade (monetary exchange of energy resources), in which Central Asian upstream countries

supply hydroelectricity in summer time in exchange for downstream neighbours' thermal electric power and hydrocarbons in the winter period.

Central Asian countries successfully cooperated when there was a supra-national body controlling energy sectors in the region. Regional state actors had also operated within a unified energy system on their own after the disintegration of the Soviet Union. Having become vulnerable to newly emerging energy security threats, Central Asian authorities realize that without governance innovation in the form of a well-functioning regional energy governance mechanism, which is based on collaboration of various energy actors, ensuring the energy security of this region would be a difficult task to accomplish. To be considered effective, regional energy governance mechanisms must be capable of ensuring the following attributes of a maximally secure CAES:

- Reliability and stability of sufficient energy supplies both in normal and emergency situations;
- Possibility to take coordinated actions for a timely and effective response to sudden energy supply cuts;
- Transit security of energy resources through Central Asian states;
- Effective enforcement mechanisms to encourage Central Asian states to fulfill their obligations, in which sacrificing some of their interests would still be better than non-compliance with terms of intergovernmental agreements;
- Joint investments in maintenance and modernization of trans-boundary electricity transmission lines and pipeline infrastructures as well as the development of the Central Asian (hydro) power sector by bringing financial resources and qualified expertise together from multilateral-institutions, civil society, and national governments. Joint

ownership can align commercial interests of all Central Asian countries and as a result, encourage them to cooperate;

- Transparency and accountability of energy sectors;
- On the country level, developing the RES and increasing energy efficiency of energy producing, consuming, and transportation facilities through the exchange of technology, expertise, and financial resources; and
- Development of the Central Asian (mainly focusing on five Central Asian states) Regional Energy Cooperation Strategy and Action Plan, because achieving the above-mentioned goals also depends on whether Central Asian energy governors share common understanding regarding what constitutes the core of energy insecurity, the seriousness of energy security challenges, and policy options to overcome those obstacles.

Lack of Effective Regional Energy Governance Mechanisms

The CAES has experienced both a highly authoritative vertical management by a supranational body and a cooperative dynamic within the resource-sharing mechanism without any regulatory institution after the disintegration of the Soviet Union. Most of the above-mentioned conditions that are now expected of the regional-energy governance mechanisms were provided by a single political centre (Moscow). Currently, however, the ongoing disintegration of the system proves that Central Asian countries are no longer capable of sustaining a maximally secure CAES. It has also become clear that ongoing disagreements between Central Asian countries cannot be resolved and more importantly future large-scale tensions prevented without an effective regional energy governance mechanism in the region. In this regard, there is a need for governance innovations that could provide conditions in which sacrificing some of their

interests due to integration of energy networks into a broader system would still be better than non-compliance with terms of intergovernmental agreements.

To ensure energy security through improved regional cooperation and energy trade, several regional-level energy governance innovations (mechanisms) were introduced within the following institutions/program: the ADB promoted the CAREC; the World Bank-supported CAEWDP, the CASA-1000, Assessment Studies of the Rogun Regional Water Reservoir in Tajikistan; the Central Asian Regional Environmental Centre; the SCO; the CIS; and, the EEU. However, the analysis of these mechanisms shows that their contribution to improve the security of the CAES is rather constrained.

As a contribution to the studies of (energy) governance, this research, by studying the Central Asian regional-level energy governance innovations, highlights that: (a) several governance mechanisms dealing with a range of issues, including energy security, may not be as effective as a single mechanism that is specifically designed to ensure security of sufficiency and sustainability of energy supplies—a number of recently established governance mechanisms failed to effectively replace one hierarchical supra-national Soviet management system to ensure security of the CAES; (b) asymmetrical power balance among key actors may negatively affect the capability of the governance mechanism to simultaneously promote interests of all—the Central Asian regional-level energy governance innovations failed to balance the trade-offs between interests of greater powers and weaker states; (c) prevailing nature of the bilateral format of negotiations may be an obstacle to the success of multilateral arrangements within the governance mechanisms; (d) transparency and accountability is key integral part of an effective governance mechanism—due to lack of transparency Central Asian leaders prioritize economic, including personal gains of certain elite groups, and political revenues over greater energy

security; (e) without an effective enforcement mechanism an attempt of the governance innovations to promote sustainability of energy sectors through greater cooperation in the energy sector may be easily challenged by the short-term benefits oriented state energy policies; (f) comprehensive institutional and conceptual instruments of the governance mechanisms do not necessarily guarantee practical implementation of regional energy projects; and (g) there are negative consequences of an underestimated importance of the shared views and values among energy actors for the development of regional energy security strategy.

Complementarity of the Regional Governance Mechanisms

Regional energy governance institutions/programs were established for various purposes. The CIS was supposed to keep former Soviet countries within already established political, security, economic, and energy ties. The EEU promotes greater economic integration, including within the energy sector. The SCO was initially established to fight security threats, but later turned to stimulate economic development and stable energy export/import relations. The World Bank and the ADB backed programs were designed to promote energy-led economic growth, transport communication, trade, water-energy balance, and energy security. Mechanisms vary from those established right after disintegration of the Soviet Union, such as the CIS, to relatively recently emerged ones like the World Bank initiatives. Some of the regional mechanisms have been gradually developed: the EurAsEC integration process was transformed into the CU of Belarus, Kazakhstan, and Russia and have now reached the EEU level; and, having started as a security organization, the SCO is currently engaged in economic and energy-sector related activities. There are governance mechanisms encompassing some Central Asian countries (the EEU) and all regional producers (the CAREC centre) as well as major external customers (the CIS, the SCO, and the CAREC). Some mechanisms are practical results oriented,

such as the CAREC, while others are designed to increase awareness of the Central Asian decision makers concerning the changing dynamics of energy security threats and how to ensure sustainability of energy sectors (the CAREC centre).

All these institutions and programs in combination can hypothetically promote cooperation among Central Asian countries leading to greater energy security. Competing energy projects promoted by various organizations, failure to pool resources together to promote joint initiatives, and the gap between conceptual and practical results oriented programs affect successful implementation of the regional-level energy projects through energy governance mechanisms.

Competing Nature of the Regional Energy Governance Mechanisms

The CAES development strategy concerns several closely interlinked dimensions including energy-led economic growth, energy export security, stable water withdrawal balance, and energy supply security. While Central Asian governance mechanisms, to some extent, deal with all these aspects of energy sector development, different actors have different preferences. The lack of communication among regional energy governance mechanisms resulted in promotion of some aspects at the expense of others. The EEU focuses on integration of the Central Asian countries' economies into the Russian-dominated union. The SCO prioritizes stability of energy export to China, avoiding conflictive competition with Russian interests over Central Asian resources. The CAREC and the World Bank initiatives are designed to enhance energy-led economic growth and energy security thus encouraging the Central Asia-South Asia partnership, which has potential but so far has failed to achieve considerable progress. Finally, the CIS promotes cooperation among former Soviet Union republics.

There are several competing energy corridors to move energy from and within Central Asia: Central Asia–East Asia; Central Asia–South Asia; Intra-Central Asia Cooperation; Central Asia–Russia; Central Asia–European Union. Despite significant energy reserves, development of these resources is currently limited. Development of each of these energy corridors is backed by a particular governance mechanism. Intra-Central Asian trade and the Central Asia–South Asian corridor largely depend on multilateral assistance from regional programs. Russia is relying on the EEU to protect its energy interests in the region. China claims to ensure stability of energy supplies through the SCO. The Central Asian case clearly illustrates how major powers use their influence within certain institutions to compete for energy and at the same time avoid conflict over resources.

Some attributes of the CAES can immediately contribute to the security of energy supplies for population and economic needs: reliability and stability of sufficient energy supplies both in normal and emergency situations; the possibility to take coordinated actions for a timely and effective response to sudden energy supply cuts; transit security of energy resources through the territories of the Central Asian states. However, security of energy supplies for Central Asian countries can only be ensured through intraregional cooperation, because each country possesses complementary sources of energy necessary to ensure short-term sufficiency and long-term sustainability of energy supplies. All of the institutions/programs encompass exporting and importing states, in which Central Asian countries represent the former. Moving energy out of the region threatens availability of sufficient and affordable energy supplies for population and economic needs of the Central Asian states. Such cooperation does contribute to the budget of the regional exporters, but not to the energy security level since in the condition of limited

energy production, state actors are increasing export capacity at the expense of domestic consumption.

Comprehensive Conceptual and Institutional Instruments Are Insufficient

The CIS, the EEU, and the CAREC have developed comprehensive conceptual tools backed by institutional apparatus to promote regional cooperation in the energy sector for member states. However, the analysis shows that possessing well-developed conceptual and institutional instruments does not necessarily ensure effective implementation of the regional-level energy projects. The CIS has probably the most comprehensive package of intergovernmental agreements regulating the oil, gas, and electric power sectors in the former Soviet republics, including Central Asian countries. However, since the CIS does not possess an effective enforcement mechanism and is considered a loose association of states most of signed intergovernmental agreements, which are not binding in nature, turning recommendation-type agreements into documents capable of forcing states to comply with terms of agreements proved to be quite challenging.

The EEU has indeed established an effective mechanism regulating the movement of almost all types of energy resources. But the most important sources are still intentionally left out of regulatory frameworks. Free movement of products within the Union excludes more than one hundred items for Kazakhstan, Kyrgyzstan, Armenia and Belarus including the most traded oil, natural gas, and electricity.

The CAREC is the only organization that has adopted the Central Asian Energy Cooperation Strategy. Regional cooperation, which the CAREC has been actively promoting, is supposed to be a powerful instrument to implement national projects that benefit all participating

states. However, practical contribution of this mechanism due to certain political constraints is still limited to a few regional-level projects in the form of technical assistance.

The Problem of Promoting Sustainability

Having focused on local-level energy projects, the CAREC does not only develop fossil fuel sectors but also promotes the renewable energy potential of the Central Asian region. And the CAREC centre aims to indirectly contribute to the promotion of regional cooperation in the energy sector in Central Asia by increasing the awareness of experts and policy makers regarding emerging energy security obstacles and the necessary policy initiatives to address these challenges. Development of a shared position over the energy security concept may incentivize state actors, multilateral institutions, and NGOs to jointly invest in maintenance and modernization of trans-boundary electricity transmission lines and pipeline infrastructures as well as the development of the Central Asian (hydro) power sector by pulling financial resources and qualified expertise together. The CAREC and the CAREC centre provide platforms for RES development and increasing energy efficiency of energy producing, consuming, and transportation facilities through the exchange of technology, expertise, and financial resources. However, since Central Asian governments' contribution to the development of RES is limited, and subsidized energy sectors affect private companies' desire to actively engage in ensuring sustainability of energy supplies, contribution of these organizations would remain insignificant.

Governance Innovations without Financial Institutions

Without financial institutions in an environment of high uncertainty in cooperation between unreliable state actors, counting on public-private partnerships can be problematic especially when it comes to realization of regional-level security-sensitive energy projects.

Regional-level energy projects are usually capital-intensive and the implementation of which requires considerable money devoted specifically for this particular purpose. But the analysis shows that financial constraints are often considered a major challenge for all the above studied governance mechanisms. Intergovernmental organizations failed to establish well-functioning financial agencies due to disagreements over the share of contribution to the budget and distribution of gains/power. For instance, cooperation within the SCO is based on consensus, but member states cannot equally contribute to the budget. Those contributing more want to have more votes, which contradicts the consensus principle. Most of the agencies within the CIS enlist underfinancing as the main challenge preventing timely and effective realization of energy projects. The CAREC has invested in total US\$4.6 billion in energy sector development projects for the last two decades in all member states. While this amount was sufficient to promote a number of local-level sustainable energy initiatives, it can hardly cover the cost of large regional-level projects. One of the principles promoted by the program is to establish public-private partnership by encouraging the private sector to take part in implementing such projects. High security risks and non-market mechanisms dominated energy trade negatively and affected the private sector representatives' desire to actively engage in energy sector development initiatives to distribute gas, oil products, and electricity to the local markets. In this regard, state actors and energy companies prefer bilateral arrangements to cooperation within multilateral framework.

Prevailing Bilateral Arrangements

Taking good advantage of asymmetrical interdependence, major powers within intergovernmental organizations use regional governance platforms such as the SCO, the EEU, and the CIS to promote their energy interests. Lack of transparency and accountability on both the Central Asian countries and major customers' (Russia and China) sides created an

environment in which it is easier to use a bilateral format of negotiations to promote energy projects. The question remains of whether bilateral agreements represent a governance approach in the context of the Central Asian energy sector management and trade. Separate bilateral arrangements-based cooperation in the Central Asian energy sector did not result from established formal or informal practices within multilateral institutions and can hardly be considered a governance mechanism. In the Central Asian context, however, successful implementation of regional-level energy projects largely depends on the power balance, which is determined by the extent of major powers' interest over the region's energy resources and regional state actors' ability to counterbalance external influence. In this regard, unless energy projects promoted by bilateral agreements are a direct result of the governance innovation and are implemented through a particular regional mechanism, it is problematic to consider such arrangements representing regional-level energy governance.

The analysis of the SCO intergovernmental mechanism to promote regional-level energy projects shows that bilateral and trilateral agreements prevail at six-sided talks. State actors' desire to keep the bilateral format of interaction is not a problem, unless actors, which do not support that format due to the asymmetry in power balance cannot change it. Currently, both regional exporters and importers may seem to support bilateral arrangements, but the former can hardly rely on such a format as an instrument to sustain mutually beneficial cooperation in the strategically important energy sector. Prevailing bilateral cooperation within the SCO in the end is presented as a direct result of regional governance mechanism. Such a format in energy supply relations prevails because the SCO member states still cannot agree upon a united position over the common strategic energy concept.

No United Position over the Energy Security Concept

Actors engaged in interaction within existing regional energy governance mechanisms often retain different, opposite and thus conflictive fundamental positions. Encompassing energy importing and exporting countries in highly politicized multilateral institutions such as the SCO, the EEU, and the CIS affects the possibility to establish well-functioning governance mechanisms, within which realization of projects is supposed to rely largely on persuasion and all participants' interests are equally taken into account. Such conflictive dynamics is clearly illustrated in the case of the EEU, where member states' positions change depending on whether they retain the status of importing or exporting countries. Importing countries vote for liberalization of energy markets, while exporters want to keep the control over strategically important resources.

Some intergovernmental organizations with sufficient resources, including technological capability, financial resources, and qualified expertise, to promote regional-level energy projects such as the SCO, still lack a unified position over energy security, and export-import balance. Without reaching a common understanding on these issues, it is impossible to develop a common strategic energy security concept that could guide actions ensuring a coordinated management of the Central Asian energy sectors. Thus, currently major powers promote regional governance innovations to improve their position and secure energy interests. Russia is promoting the EEU, but opposes common regulation of major energy resources, while China promotes the SCO regional framework, but relies on bilateral agreements.

Conversely, there are governance mechanisms in Central Asia that seem to achieve certain underplay among member states over the importance of regional energy cooperation, at least officially. Adopting regional strategy for cooperation and working out action plans can be

an asset for Central Asian countries to improve energy policies to ensure that their energy security interests are taken into consideration. Such strategies would suggest that the Central Asian energy governors share a common understanding regarding what constitutes the core of energy insecurity, the seriousness of energy security challenges, and policy options to overcome those obstacles. The CAREC has adopted a regional cooperation strategy in the energy sector, yet without sufficient resources and support from its member states, achieving their set up goals has turned problematic.

Isolated Energy Systems

In the Central Asian context, there is currently a problem of the physical isolation of energy sectors. Not all energy systems of the former Soviet Union were connected to each other. Within the CIS framework, the CAES is still isolated from that of other member states. Since the CIS energy systems are not properly connected, it has turned out to be quite difficult to ensure coordinated operation of those electric power grids and pipeline networks.

Within the EEU, while Russia is connected to the northern electric power grids of Kazakhstan, southern parts of the country, Kyrgyzstan, and Tajikistan are physically isolated from the Russian electric power grid and gas pipeline systems. Russia can potentially ensure supply of energy resources to other EEU members by serving as a middleman between Uzbekistan and Central Asian upstream states to transport energy through the Uzbek energy system. The middleman role of Russia would have greater affect if Uzbekistan joined the EEU. Uzbekistan, however, is currently not considering membership in the organization. Establishing the EEU energy system, avoiding Uzbek territory, will not only take time, but will also require investments that the regional actors are not willing to provide. In this sense, it is quite challenging to establish parallel operation of the unified energy system when such a system does

not physically exist. There are currently no electric power grids or pipeline infrastructures connecting Central Asian resources with the broader South Asian energy markets.

The cost of the construction of CASA–1000 electricity supply networks promoted by the CAREC and the World Bank initiatives are estimated around US\$1 billion. However, none of these institutions takes responsibility for covering the total cost of building electric power grids. Aside from security issues, physical disconnection between Central Asian resources and the South Asian market is currently the biggest challenge along the way toward facilitating energy trade-led economic growth and energy security.

Currently, there are gas and oil pipeline networks connecting Central Asian hydrocarbon resources with Russian and Chinese energy markets. As was previously mentioned, these energy corridors are constructed to move Central Asian resources to outside markets. Attractive in terms of potential input to the budget of the Central Asian producers, these projects have limited contribution to these countries' energy security. Out of five energy corridors, only the intra-Central Asian region is interconnected through electric power and gas supply networks forming a complete energy system. The resource-sharing mechanism, however, no longer contributes to energy security of the Central Asian states through exchange of resources.

Lack of Enforcement Mechanism

Although the primary goal of institutions and programs designed to ensure security of the CAES through governance innovations is, among many other issues, to ensure region's energy security, most simply lack enforcement mechanisms. Even though the infrastructure connecting Central Asian countries' energy sectors is still in place, the CIS as a governance mechanism fails to encourage or enforce its Central Asian members to reinstate coordinated operations of their energy sectors. The World Bank has released the final assessment report of the Rogun dam

according to which the highest possible option of the dam was found to be the most economically efficient. It was perhaps expected that once independent experts released the results of assessments both public and private sectors would rush to invest in the project. However, no further progress has been made in this direction due to absence of mechanisms ensuring implementation of the project in which all actors' interests are taken into account. Since the CAREC currently focuses on local-level energy projects, Central Asia, within the framework of the regional energy cooperation strategy, represents only a geographical area composed of separate units rather than integrated region. Due to lack of enforcement mechanisms, the CAREC representatives cannot go beyond conceptually justifying the importance of regional cooperation. The EEU is quite selective in regulating types of energy and mineral resources. It is expected that the common electricity market of the EEU will be formed by 2019 and the oil and gas market only in 2025 if at all. The recently established SCO Energy Club is specifically designed to deal with energy development issues, including energy security and energy-led economic growth, but provides only recommendation-type documents with no binding power. The SCO Energy Club is thus just a formally existing agency whose main objective is to provide recommendations to member states on how to respond to energy security challenges and to promote regional cooperation.

Recommendations

The dissertation finds that intra-Central Asian energy trade has several direct positive effects on the level of energy security in the region. Regional state actors inherited pipeline and electric power networks saving them from considerable upfront investments in infrastructure, which most of Central Asian states would fail to afford. Comparative advantage in developing

complementary energy sources provides conditions for using energy in the most rational way. Since the volume of electricity and natural gas export/import in the region is relatively insignificant, such trading arrangements do not threaten the availability of energy to external customers and thus, do not provoke immediate confrontation from their side. Central Asian energy trade does not only solve the problem of uneven distribution of resources, but also ensures sufficiency of affordable energy supplies. In this sense, there is an urgent need to restore intra-Central Asian energy trade, at least in the average amount traded within the last decade, while temporarily refraining from the further development of projects capable of affecting water distribution and energy supply balance. Promote dialogue among those experts who directly advise decision makers so that they can reach united position regarding key attributes of the Central Asian energy security is also recommended. Central Asian governments should also take full advantage of the assistance offered by multilateral programs. Although intra-Central Asian energy trade, based on annually renewed agreements signed just to meet energy demand peaks, does not necessarily require regional-level energy governance mechanism, long-term sustainability of energy supplies is directly linked to well-functioning governance mechanism.

This analysis shows that reinstating intra-Central Asian energy trade is currently the most optimal policy option to ensure availability of energy resources at lower prices, provide stability of supplies to meet energy demand peaks, and diversify sources of energy in the consumption balance in the short- to medium-term perspectives. To achieve these goals the research provides several recommendations.

First, it is recommended that Central Asian countries reinstate energy trade in the average amount of resources being exchanged over the past decade on the basis of annually renewed bilateral agreements:

- export of 500 million m³ of gas per year to Kyrgyzstan and 300 million m³ per year to Tajikistan from Uzbekistan under the condition that trading partners set a justified price;
- electricity supply of 800–1,800 GWh annually (depending on wet and drought years) from Tajikistan and Kyrgyzstan in exchange for the same amount of electricity supply from Uzbekistan;
- 1000 GWh electricity supply annually from Turkmenistan to Tajikistan and the same amount in reverse direction via swap deals with Uzbekistan;
- 3.5 billion m³ per year gas supply to southern regions of Kazakhstan either directly from Uzbekistan or via swap deals from Turkmenistan.

Second, to reinstate and sustain intra-Central Asian energy trade, it is advisable for decision makers and the experts counselling them to reach shared position over key attributes of the CAES and develop a Central Asian energy security strategy.

Central Asian decision makers often fail to reach consensus over water-energy balance and take coordinated actions to respond to energy security challenges, because they prioritize different aspects of cooperation (energy supply security, increasing export capacity, water, and energy modes of HPPs) in their energy policies.

It is recommended to use existing governance platforms for a more active dialogue among experts directly advising decision makers from such institutions as:

- Kazakhstan Institute for Strategic Studies under the president of Kazakhstan, and the Library of the First President of the Republic of Kazakhstan;
- Center for Economic Research, Institute for Strategic and Regional Studies under the President of Uzbekistan;

- National Institute for Strategic Studies of Kyrgyzstan;
- Center for Strategic Studies under the President of Tajikistan; and
- National Institute for Strategic Planning and Economic Development of Turkmenistan.

Third, if there is a need for a trade-off between energy cooperation and construction of large HPPs in the region, until Central Asian republics reach a solution amenable to all, it is recommended that:

- Tajikistan having completed 70m of the Rogun dam, starts operating two blocks of the HPP;
- Uzbekistan reinstates supplies of gas and thermal electricity to Tajikistan to cover the country's winter energy needs;
- parties provide guarantees that no further construction of the dam will be pursued, unless agreed by both downstream and upstream countries, and no sudden unilateral energy supply cuts will take place.

Fourth, one of the main counter-arguments from the Uzbek side regarding the construction of the 335m high Rogun dam was the fact that studies conducted by the World Bank assessed environmental and social impact for only the Vaksh River basin around the dam. Uzbek authorities conclude from this that the dam can potentially be destroyed and the consequences for the downstream countries will be devastating. It could be recommended that regional state actors seek a second round of independent expertise on environmental, social, and economic impact assessment of large HPPs on downstream Central Asian states, under the condition that these states grant full access to facilities and data necessary to conduct the assessment. The main focus of the assessment would not be the extent of damage in case of failure of the dam, but rather

possible measures that could be taken capable reducing the extent of devastation. The assessment period will serve as a time frame for postponing further construction of Rogun, restoring energy trade, and breaking the status quo in the relationships between Uzbekistan and Central Asian upstream countries.

Fifth, it is also recommended that Central Asian governments seek financial and technical assistance in implementing regional-level energy projects from multilateral programs and NGOs within the CAREC. Having limited financial capabilities, Uzbekistan, Kyrgyzstan, and Tajikistan may resist getting involved in projects that require relatively large investments to upgrade or build new energy infrastructure, train personnel, or introduce new technologies on their own. Support from multilateral institutions will be a good incentive to pursue regional-level energy projects. Attracting foreign investors through public-private partnership initiatives within the program might be a good alternative to reduce dependence on external state actors such as China or Russia.

Sixth, throughout the analysis it became obvious that only intra-Central Asian energy trade and cooperation can contribute to the security of the CAES. And, hypothetically, promotion of the Central Asian energy security would depend on energy governance innovations with the membership of all five regional state actors specifically designed to ensure security of the CAES. Since regional state actors are financially incapable and often unwilling to equally contribute to the formation of such mechanisms and the relevant institutional apparatus, Central Asian states themselves would refrain from making moves in this direction. External players have their own interests over the region's resources, which do not include strengthening the CAES through integration of regional energy sectors. In this sense, the most optimal strategy would be to take advantage of all existing regional governance mechanisms by promoting communication among

them. Energy trade within the Central Asian region can restore trust and promote energy resources exchanging mechanisms. As the first step toward establishing a maximally secure CAES, reinstating energy trade does not necessarily require complex regional energy governance mechanisms. As the research shows, energy-trading arrangements within current geopolitical realities have a greater chance of implementation through bilateral format of negotiations and agreements. Regional-level energy governance mechanisms in the short-term perspective must provide a platform for negotiations to conclude either bilateral or multilateral agreements, contribute to the transparency of the process and ensure implementation of those agreements. Ensuring sustainability and reliability of energy supplies within the CAES, however, has to be backed by well-functioning regional-level energy governance mechanism. Once Central Asian countries restore cooperation in their energy sectors, there will be ground for either establishing a new energy governance mechanism specifically designed to improve energy cooperation and ensure energy trade-led economic growth as well as the security of energy supplies within the Central Asian region or concentrate on transforming one of the existing mechanisms into an instrument that pulls Central Asian states together.

Bibliography

- Abdurasulova, N., and N. Kravsov. "Electricity Governance in Kyrgyzstan: An Institutional Assessment." *Civic Environmental Foundation UNISON*, 2009.
- "ABR Otkazalsya Finansirovat Stroitelstvo Rogunskoy GES iLEP v Pakistan (ADB Refused to Finance the Construction of Rogun HPP and ETL to Pakistan)." *Regnum.ru*. January 17, 2014. Accessed January 20, 2014. <http://www.regnum.ru/news/1755635.html>.
- Adilet legal portal. *O Programme Razvitiya Elektroenergetiki do 2030 Goda (On the Program on Electric Power Development until 2030)*. Adilet.zan.kz, 2010. Accessed March 1, 2014. http://adilet.zan.kz/rus/docs/P990000384_.
- Akhmadov, Erkin. "Uzbekistan's Quest for Aral Sea Oil May Weaken Kazakhstan's Position in the Caspian." *Eurasia Daily Monitor* 9, no. 23 (2012). Accessed May 5, 2014. <http://www.cacianalyst.org/?q=node/5905>.
- Akhmetov, Almaz. Expert at Regional Environmental Center of Central Asia, Skype Interview. July 26, 2013.
- Alaolmolki, Nazar. *Life after the Soviet Union: The Newly Independent Republics of the Transcaucasus and Central Asia*. Albany: State University of New York Press, 2001.
- Alhaji, Anas F. "What Is Energy Security? Definitions and Concepts (Part 3/5)." *Middle East Economic Survey* 50, no. 45 (2007). Accessed September 20, 2011. <http://archives.mees.com/issues/213/articles/8255>.
- Alixanov, V. V. "Konseptualnie Podxodi k Formirovaniyu 'Green Economy' v Uzbekistane (Conceptual Approaches to Green Economy in Uzbekistan)." *Center for Economic Research, Analytical report*, 2011.
- Allison, Roy, and Lena Jonson. *Central Asian Security The New International Context*. London: Royal Institute of International Affairs, 2001.
- Asian Development Bank, CAREC Unit. *A Strategic Framework for the Central Asia Regional Economic Cooperation Program 2011–2020*. Mandaluyong City: Asian Development Bank, 2012. Accessed May 5, 2014. <http://www.carecprogram.org/uploads/docs/CAREC-Publications/2012/CAREC-2020-Strategic-Framework.pdf>.
- Asian Development Bank, CAREC Unit. *All Key Energy Projects*. Metro Manila: Central Asia Regional Economic Cooperation Program, n.d. Accessed May 15, 2014. <http://www.carecprogram.org/index.php?page=all-energy-projects>.
- Asian Development Bank, CAREC Unit. *At a Glance*. Metro Manila: Central Asia Regional Economic Cooperation Program, n.d. Accessed December 1, 2014. <http://carecprogram.org/>.
- Asian Development Bank, CAREC Unit. *Energy Sector Coordinating Committee Work Plan 2013–2015*. Metro Manila: Central Asia Regional Economic Cooperation Program, 2012. Accessed May 10, 2014. <http://www.carecprogram.org/uploads/docs/CAREC-Energy-Sector-Coordinating-Committee-Work-Plan-2013-2015.pdf>.

- Asian Development Bank, CAREC Unit. *Energy Results*. Metro Manila: Central Asia Regional Economic Cooperation Program, n.d. Accessed December 1, 2014. <http://www.carecprogram.org/index.php?page=energy>.
- Asian Development Bank, CAREC Unit. *Projects Supported by the CAREC Program*. Metro Manila: Central Asia Regional Economic Cooperation Program, 2014. Accessed December 5, 2014. http://www.carecprogram.org/index.php?page=carec-projects&or=energy#table_start.
- Asian Development Bank, CAREC Unit. *Pushing for Energy Security and Trade in the Region*. Metro Manila: Central Asia Regional Economic Cooperation Program, n.d. Accessed September 15, 2014. <http://www.carecprogram.org/index.php?page=energy>.
- Asian Development Bank, CAREC Unit. *Regional Cooperation at Work in Central Asia*. Metro Manila: Central Asia Regional Economic Cooperation Program, n.d. Accessed December 1, 2014. <http://www.carecprogram.org/index.php?page=carec-program>.
- Asian Development Bank, Technical Assistance Consultant. *Central Asia Regional Economic Cooperation: Power Sector Regional Master Plan*. Metro Manila: Asian Development Bank, Report no. 43549, 2012. Accessed January 15, 2015. <http://adb.org/sites/default/files/projdocs/2010/43549-01-reg-tar.pdf>.
- Axelrod, Robert M., and St. D. Hamilton. *The Evolution of Cooperation*. New York: Basic Books, 1984. In Curtis S. Signorino. "Simulating International Cooperation Under Uncertainty." *The Journal of Conflict Resolution* 40, no. 1 (March 1996).
- Axelrod, Robert M. "The Evolution of Strategies in the Iterated PD." In *The Dynamics of Norms* by Cristina Bicchieri, Richard C. Jeffrey, and Brian Skyrms. Cambridge: Cambridge University Press, 1997.
- Baccini, Leonardo, Veronica Lenzi, and Paul St. Thurner. "Global Energy Governance: Bilateral Trade and the Diffusion of International Organizations." *LMU Munich* (n.d.).
- Bahgat, Gawdat. "Central Asia and Energy Security." *Asian Affairs* 37, no. 1 (2006). doi:10.1080/03068370500456819.
- Bahgat, Gawdat. "Europe's Energy Security: Challenges and Opportunities." *International Affairs* 82, no. 5 (2006). doi:10.1111/j.1468-2346.2006.00580.x.
- Bahgat, Gawdat. "The Geopolitics of Energy in Central Asia and the Caucasus." *The Journal of Social, Political, and Economic Studies* 34, no. 2 (2009).
- Bahgat, Gawdat, and Gawdat Bahgat. *Energy Security: An Interdisciplinary Approach*. Chichester, West Sussex, U.K.: Wiley, 2011.
- Barnett, Michael N., and Martha Finnemore. *Rules for the World: International Organizations in Global Politics*. Ithaca, N.St.: Cornell University Press, 2004.
- Baron, Ziyi. "Energy Governance through Innovation Reducing Global Oil Dependency in Transportation through Innovation." *Koret-Milken Institute Fellow program*, no. 38 (2010).

- Batkar, Mamta. "The Ultimate Guide To China's Voracious Energy Use." *Business Insider*, August 17, 2012. Accessed March 5, 2013. <http://www.businessinsider.com/china-energy-use-2012-8?op=1>.
- Becker, Michael. "Regional Energy Market in Central Asia." *RESET*, 2011.
- Belstat. "Belneftekhim." Concern, Ministry of Oil and Gas of the Republic of Kazakhstan, Ministry of Power Engineering of Russia. Accessed December 5, 2014. http://eurasiancommission.org/en/act/energetikaiinfr/energ/energo_stat/Pages/neft.aspx.
- Bell, Imogen et al. *Eastern Europe, Russia and Central Asia 2003*. London: Europa Publications, 2002.
- Berdiev, Rustam. Procurement/Asset Management Assistant, Organization for Security and Co-operation in Europe, Center in Ashgabat. Ashgabat, Turkmenistan, September 7, 2013.
- Berdybekova, Aidana. Personal Interview, Regional Cooperation Coordinator (Consultant) Kyrgyz Resident Mission. Bishkek, Kyrgyzstan, February 4, 2014.
- Bicchieri, Cristina, Richard C. Jeffrey, and Brian Skyrms. *The Dynamics of Norms*. Cambridge: Cambridge University Press, 1997.
- Bisenov, Naubet. "Neighbourly Negotiations." *Energy Global*, 2013. Accessed June 15, 2014. http://www.energyglobal.com/news/pipelines/articles/Neighbourly_negotiations_an_analysis_of_central_asian_energy_pipelines.aspx.
- Bochkarev, Danila. "EU Investment in Turkmenistan's Energy Upstream: Mission Impossible?" *European Energy Review*, April 30, 2015. Accessed May 25, 2015. <http://europeanenergyreview.com/site/pagina.php?id=4363>.
- Bochkarev, Danila. "Another Pipe Dream?" *Natural Gas Europe*, March 25, 2015. Accessed May 25, 2015. <http://www.naturalgaseurope.com/another-pipe-dream-22882>.
- Bordoff, Jason and Trevor Houser. "American Gas to the Rescue? The Impact of US LNG Exports on European Security and Russian Foreign Policy." *Center for Global Energy Policy*, September 2014, 29. Accessed May 14, 2015. http://energypolicy.columbia.edu/sites/default/files/energy/CGEP_American%20Gas%20to%20the%20Rescue%3F.pdf.
- British Petroleum Company. *BP Statistical Review of World Energy June 2015*. London: British Petroleum Co., 2015. Accessed June 25, 2015. <http://www.bp.com/content/dam/bp/pdf/Energy-economics/statistical-review-2015/bp-statistical-review-of-world-energy-2015-full-report.pdf>.
- Bulkeley, Harriet, and Michele Betsill. "Rethinking Sustainable Cities: Multilevel Governance and the 'Urban' Politics of Climate Change." *Environmental Politics* 12, no. 2 (2006). doi:10.1080/0964401042000310178.
- Business News Europe. "Central Asia Supplies Close to Half of Chinese Gas Imports in 2013." *The Uyghur American Association*, June 18, 2014. Accessed June 1, 2015. <http://uyghuramerican.org/article/central-asia-supplies-close-half-chinese-gas-imports-2013.html>.

- Buzan, Barry, Ole Waever, and Jaap St. de Wilde. *Security: A New Framework for Analysis*. Boulder [u.a.]: Rienner, 1998.
- Buzan, Barry. "Peace, Power, and Security: Contending Concepts in the Study of International Relations." *Journal of Peace Research* 21, no.2 (1984): 109–125.
- Buzar, Stefan. *Energy Poverty in Eastern Europe: Hidden Geographies of Deprivation*. Burlington, VT: Ashgate, 2007.
- "Central Asia Considers Alternatives to Gazprom for Exporting Gas. Will Silk Road Producers Actually Prefer Europe to Russia?" *Central Asian Online*. November 18, 2011. Accessed June 5, 2013.
http://centralasiaonline.com/en_GB/articles/caii/features/main/2011/11/18/feature-01?change_locale=true.
- Central Asia Data Gathering and Analysis Team. "Trade Policies and Major Export Items in Central Asia." *Central Asia Regional Data Review, OSCE Academy and NUIP8* (2013). Accessed May 15, 2014. <http://www.osce-academy.net/upload/GADGAT/CADGAT8.pdf>.
- "Central Asia Power System." *Exploring Kazakhstan and Post-Soviet Central Asia, One Steppe at a Time* (blog). n.d. Accessed December 20, 2013.
<http://onesteppeatatime.wordpress.com/2012/06/08/central-asia-power-system/>.
- "Central Asia-China Gas Pipeline, Turkmenistan to China." *Hydrocarbons-technology*. n.d. Accessed May 1, 2013. <http://www.hydrocarbons-technology.com/projects/centralasiachinagasp/>.
- Chang, Youngho and Swee Lean Collin Koh, "Rethinking Market Governance and Energy Security," (Chapter 2). In *Energy and Non-Traditional Security (NTS) in Asia*, edited by Mely Caballero Anthony, Youngho Chang, and Nur Azha Putra. Berlin: Springer, 2012.
- Chernayev, A. *High Paces to Scale Construction*. Government of the Republic of Turkmenistan, 2012. Accessed March 10, 2014. http://turkmenistan.gov.tm/_eng/?id=1129.
- Chroshabiyev, Payrav. "Uzbekistan's Decision to Withdraw from CA Power Grid Provoked by Tajikistan Itself, Says Tajik Expert." *ASIA-Plus*, November 9, 2009. Accessed May 1, 2015. <http://news.tj/en/news/uzbekistan-s-decision-withdraw-ca-power-grid-provoked-tajikistan-itself-says-tajik-expert>.
- Ciuta, F. "Conceptual Notes on Energy Security: Total or Banal Security?" *Security Dialogue*, 2010. doi:10.1177/0967010610361596.
- Clemens, Walter C. *Dynamics of International Relations: Conflict and Mutual Gain in an Era of Global Interdependence*, 2nd ed. Lanham, MD: Rowman & Littlefield Publishers, 2004.
- Clements et al. *Energy Subsidy Reform: Lessons and Implications*. Washington: International Monetary Fund, 2013. Accessed August 5, 2014.
<http://www.imf.org/external/np/pp/eng/2013/012813.pdf>.
- Cohen, Ariel. *Kazakhstan: The Road to Independence: Energy Policy and the Birth of a Nation*. Uppsala: Silk Road Studies Program, Institute for Security and Development Policy [distributor], 2008.

- Collins, Kathleen. "Economic and Security Regionalism among Patrimonial Authoritarian Regimes: The Case of Central Asia." *Europe-Asia Studies* (61), no. 2, (March 2009): 249–281.
- Commonwealth of Independent States Executive Committee. *44th Meeting of the CIS Electric Power Council Took Place on November 1, 2013*. Minsk: Commonwealth of Independent States, 2013. Accessed June 7, 2014. <http://www.cis.minsk.by/news.php?id=2252>.
- Commonwealth of Independent States Executive Committee. *Agreement on Transit of Electricity and State's Power Capacities – Members of the Commonwealth of Independent States*. Minsk: Commonwealth of Independent States, n.d. Accessed June 5, 2014. <http://www.cis.minsk.by/page.php?id=1946>.
- Commonwealth of Independent States Executive Committee. *Energy is the Key Area of Cooperation of the CIS Countries in 2009*. Minsk: Commonwealth of Independent States, 2009. Accessed June 5, 2014. <http://www.cis.minsk.by/page.php?id=13376>.
- Commonwealth of Independent States Executive Committee. *Informaciya o Reshenii Nekotorix Voprosov, Negativno Vliyayushix na Mnogostoronnee Torgovo-Ekonomicheskoe Sotrudnichestvo v Ramkax SNG (Information about Resolving Some Issues Negatively Affecting Multilevel Trade Cooperation Within the CIS)*. Minsk: Commonwealth of Independent States, n.d. Accessed June 20, 2014. <http://www.cis.minsk.by/page.php?id=408>.
- Commonwealth of Independent States Executive Committee. *Intergovernmental Council on Oil and Gas*. Minsk: Commonwealth of Independent States, n.d. Accessed June 10, 2014. <http://www.cis.minsk.by/page.php?id=2498>.
- Commonwealth of Independent States Executive Committee. *Koncepciya Predstavitelstva Respubliki Tadjikistan v Sodrujestve Nezavisimix Gosudarstv (The Concept of the Republic of Tajikistan's Chairmanship in the Commonwealth of Independent States in 2011)*. Minsk: Commonwealth of Independent States, 2011. Accessed June 25, 2014. <http://www.cis.minsk.by/page.php?id=18743>.
- Commonwealth of Independent States Executive Committee. *Results for the last 20 Years and Objectives for the Future*. Minsk: Commonwealth of Independent States, 2011. Accessed June 15, 2014. <http://www.cis.minsk.by/news.php?id=289>.
- Commonwealth of Independent States. *Information on Bodies of the Commonwealth of Independent States*. Internet-Portal CIS, n.d. Accessed June 10, 2014. <http://www.e-cis.info/page.php?id=2374>.
- Commonwealth of Independent States. *O Razvitii Sotrudnichestva Gosudarstv – Uchastnikov SNG v Sfere Elektroenergetiki. Problemi i Perspektivi (On the Development of Cooperation of CIS Member States in the Field of Energy. Problems and Perspectives)*. CIS Internet Portal, 2013. Accessed May 20, 2014. <http://www.e-cis.info/page.php?id=23654>.
- "Construction of Beineu–Bozoy–Shymkent Gas Pipeline to Wrap up by Year End." *Kazinform International News Agency*, February 25, 2014. Accessed May 20, 2015. <http://www.inform.kz/eng/article/2634098>.

- Cooley, Alexander, and James Ron. "The NGO Scramble: Organizational Insecurity and the Political Economy of Transnational Action." *International Security* 27, no. 1 (2002): 5-39. doi:10.1162/016228802320231217.
- Cooley, Alexander. *Great Games, Local Rules: The New Great Power Contest in Central Asia*. New York: Oxford University Press, 2012.
- Customs Union and Single Economic Space. *The Volume of Import Supplies of the Republic of Kazakhstan from States – Members of the CU and Single Economic Space for January-March 2013*. Moscow: Customs Union and Single Economic Space, 2013. Accessed December 1, 2014. http://www.tsouz.ru/db/stat/iCU201303/Documents/i201303_10.pdf.
- Dagiev, Dagikhudo. Personal Interview, Research Associate at the Institute of Ismaili Studies in London. Astana, Kazakhstan, May 25, 2014.
- Daly, C.K. John. "Pipeline Explosion Reseals Turkmenistan–Gazprom Rift." *United Press International*, April 13, 2009. Accessed May 15, 2014 http://www.upi.com/Business_News/Energy-Industry/2009/04/13/Pipeline-explosion-reveals-Turkmenistan-Gazprom-rift/16101239666679/.
- Delina, Laurence L. "Coherence in Energy Efficiency Governance." *Energy for Sustainable Development* 16 (2012): 493–499.
- Denisenko, Dmitriy. "Kirgizstan Prekratil Platit' Uzbekistanu za Transit Elektroenergii (Kyrgyzstan Stopped Paying Uzbekistan for Power Transit)." *Vb.kg*, January 24, 2014. Accessed January 25, 2014. http://www.vb.kg/doc/259320_kyrgyzstan_prekratil_platit_yzbekistany_za_tranzit_elektroenergii.html.
- Deniz, Derya. "Top Development Aid Groups in Central Asia: A Primer Devex." *Devex*, April 23, 2011. Accessed March 5, 2015. <https://www.devex.com/news/top-development-aid-groups-in-central-asia-a-primer-74324>.
- Dinar, Ariel, Shlomi Dinar, Stephen McCaffrey, and Daene Mckinney. *Bridges Over Water: Understanding Transboundary Water Conflict, Negotiation and Cooperation*. New Jersey: World Scientific, 2007.
- Djanibekov et al. *Pros and Cons of Cotton Production in Uzbekistan* (Case-study 7–9, Cornell University, 2010). In "Revisiting Water Issues in Central Asia: Shifting from Regional Approach to National Solutions." By Nariya Khasanova, *Central Asia Fellowship Papers*, No. 6, October 2016. Accessed June 1, 2015. <https://app.box.com/s/fornzf5490xyou1juaw0>.
- Donis, Ivan. "S 1 Oktyabrya v Kirgizii Vvodyatsya Veernie Otklyucheniya Sveta (Kyrgyzstan is Introducing Rolling Blackouts Starting from October 1, 2014)." *News-Asia*, August 13, 2014. <http://www.news-asia.ru/view/ks/6991>.
- Donnelly, Jack. *Realism and International Relations*. Cambridge [England]: Cambridge University Press, 2000.
- Dorian, James P. "Central Asia: A Major Emerging Energy Player in the 21st Century." *Energy Policy* 34 (2006). doi:10.1016/j.enpol.2005.11.009.

- Dovlatov, Rovshan. "Energeticheskiy Proekt po Postavkam Elektroenergii iz Stran Centralnoy Azii v Yujnuyu Aziyu Budet Realizovan Prejde Vsego po Politicheskim Motivam (Energy Project to Supply Electricity from Central Asia to South Asia will be Implemented Primarily for Political Reasons)." *Expertonline*, June 27, 2013. Accessed September 1, 2014. <http://expertonline.kz/a11231/>.
- Economist Intelligence Unit. "Turkmenistan Gas: Galkynysh Gas Output will Boost Growth in 2014," September 24, 2013. Accessed April 15, 2015. <http://performance.ey.com/wp-content/uploads/downloads/2013/10/EY-Performance-Turkmen-gas-and-growth.pdf>
- Ebinger, Charles K. *Energy and Security in South Asia Cooperation or Conflict? Washington, D.C.: Brookings Institution Press, 2011.*
- Electric Power Stations. *Investicionnie Proekti (Investment Projects)*. Bishkek: Electric Power Stations, n.d. Accessed December 1, 2014. <http://www.energo-es.kg/?page=articles&read=6>.
- Electric Power Stations. *Sotrudnichestvo s Zarubejnimi Partnerami (Cooperation with Foreign Partners)*. Bishkek: Electric Power Stations, n.d. Accessed December 3, 2014. <http://www.energo-es.kg/?page=articles&read=7>.
- Electric Power Stations. "Elektricheskie Stancii: Kambarata-1 (Electric Power Stations: Kambarata-1)". Bishkek: Electric Power Stations, 2014. Accessed February 2, 2015. <http://www.energo-es.kg/?page=article&read=43>.
- Electric Power Stations. *Elektricheskie Stancii (Electric Power Stations)*. Bishkek, n.d. Accessed January 27, 2015. <http://www.energo-es.kg/?page=articles&read=18>.
- "Elektroenergetika Turkmenistana (Electric Power in Turkmenistan)." Accessed March 1, 2015. <http://energo-cis.ru/wyswyg/file/Turkmenistan.pdf>.
- Elworthy, Charles. "The Energy Commons. A Governance Framework for Climate Stability and Energy Security." 2011. https://www.academia.edu/834236/The_Energy_Commons_A_Governance_Framework_for_Climate_stability_and_Energy_Security.
- Embassy of the Russian Federation to the Republic of Kazakhstan. *Eurasian Economic Integration in Progress*. Astana: Embassy of the RF to Kazakhstan, 2013. Accessed October 5, 2014. http://www.rfembassy.kz/eng/lm/integraciya/evraziiskaya_integraciya/.
- Energy Charter Secretariat. *In-Depth Energy Efficiency Review Tajikistan*. Brussels: Energy Charter Secretariat, 2013. Accessed May 20, 2014. http://www.encharter.org/fileadmin/user_upload/Publications/Tajikistan_EE_2013_ENG.pdf.
- "Energeticheskaya Politika Turkmenistana: Diversifikaciya Eksporta Gaza (Energy Policy of Turkmenistan: Gas Export Diversification)." *Ministry of Oil and Gas Industry and Mineral Resources Journal*. Accessed May 25, 2015. <http://www.oilgas.gov.tm/publikatsii/item/416>.
- Eni. World Oil and Gas Review for 2014. Rome: Eni spa, September 2014. Accessed June 15, 2015. <https://www.eni.com/world-oil-gas-review-2014/sfogliabile/O-G-2014.pdf>.

- “An Enlarged Session of the Cabinet of Minister of Turkmenistan.” *State News Agency of Turkmenistan*, July 7, 2014. Accessed December 5, 2014.
<http://tdh.gov.tm/en/politics/news/10466-2014-07-07-23-14-51>.
- Ergasheva, Zarina. “Government Endorses the Plan for Restructuring TALCO.” *Asia-Plus*, April 19, 2013. June 1, 2015. <http://news.tj/en/news/government-endorses-plan-restructuring-talco>.
- Eurasian Economic Commission. *EEC Advisory Committee for Oil and Gas Held Its First Meeting*. Moscow: Eurasian Economic Commission, 2013. Accessed December 1, 2014.
<http://eurasiancommission.org/en/nae/news/Pages/65464654.aspx>.
- Eurasian Economic Commission. *Eurasian Economic Integration: Facts and Figures*. Moscow: Library of Eurasian Integration, 2014. Accessed December 1, 2014.
http://www.eurasiancommission.org/en/Documents/broshura26_ENGL_2014.pdf
- Eurasian Economic Commission. *Gruppa 27: Toplivo Mineralnoe, Neft i Produkti ix Peregonki; Bituminoznie Veshestva; Voski Mineralnie (Group 27: Mineral Fuels, Oil and Products of Its Distillation; Bituminous Substances; Mineral Waxes)*. Moscow: Eurasian Economic Commission, n.d. Accessed May 10, 2014.
<http://www.tsouz.ru/db/ettr/PSN/Pages/psn27.aspx>.
- Eurasian Economic Commission. *The Volume of Export Supplies of the Republic of Kazakhstan to States – Members of the CU and Single Economic Space for January–March 2013*. Moscow: Customs Union and Single Economic Space, 2013. Accessed July 5, 2014.
http://www.eurasiancommission.org/ru/act/integr_i_makroec/dep_stat/trade/vzaim_stat/i_CU201311/Documents/i201311_11.pdf.
- Eurasian Economic Commission. “Important Events in the Activity of the Department of Energy.” 2014. Accessed January 5, 2015.
<http://eurasiancommission.org/ru/act/energetikaiinfr/energ/events/Pages/default.aspx>.
- Eurasian Economic Community. *Fundamentals of Energy Policy of the Eurasian Economic Community*. Moscow: Eurasian Economic Community, 2003. Accessed February 20, 2011. <http://evrazes.com/docs/view/152>.
- “Eurasian Economic Union Heads of State Sign 20 Documents.” *Itar-TASS*. 2014. Accessed May 1, 2015. <http://itar-tass.com/en/economy/768795>.
- Fedorenko, Vladimir. “Prospects for Water Cooperation in Central Asia.” Rethink Paper 14, February 2014. Accessed March 25, 2015. <http://www.rethinkinstitute.org/wp-content/uploads/2014/02/Fedorenko-Prospect-of-Water-Coop.pdf>
- Food and Agriculture Organization of the United Nations. “Aral Sea Transboundary River Basin.” *Aquastat Website*, 2012. Accessed March 1, 2015.
<http://www.fao.org/nr/water/aquastat/basins/aral-sea/index.stm>.
- Foreign Affairs Committee. *Global Security: Russia: Second Report of the Foreign Affairs Committee of Session 2007–08: Report, Together with Formal Minutes, Oral and Written Evidence*. The Stationery Office, 2007.

- Fredholm, Michael. "Natural Gas: An Expensive Trickle." *Transitions Online*, April 10, 2008. Accessed July 1, 2009. <http://www.tol.org/client/article/19509-an-expensive-trickle.html?print>.
- Freeman, Charles St. *Arts of Power: Statecraft and Diplomacy*. Washington, DC: United States Institute of Peace Press, 1997.
- Frye, Timothy and Edward D. Mansfield. "Fragmenting Protection: The Political Economy of Trade Policy in the Post-Communist World." *British Journal of Political Science* 33, no. 4 (2003): 635–57.
- Fuel Energy Sector Transparency Initiative in Kyrgyz Republic. "Kambaratinskie Strasti (Kambarata Passion)." *Energoforum*, December 10, 2012. Accessed June 5, 2014. http://www.energoforum.kg/index.php?act=view_material&id=374.
- "Galkynysh Gas Field, Turkmenistan." *Hydrocarbons-technologies*, n.d. Accessed June 1, 2015 <http://www.hydrocarbons-technology.com/projects/-galkynysh-gas-field-turkmenistan/>.
- Garrison, Jean A., and Ahad Abdurahmonov. "Explaining the Central Asian Energy Game: Complex Interdependence and How Small States Influence their Big Neighbors." *Asian Perspective* 35 (2011).
- "Gazprom Videlit Dopolnitelnie 330 mln. Kubometrov Gaza Kirgizstanu (Gazprom will Supply Additional 330 mcm of Gas to Kyrgyzstan)." *TREND*, October 27, 2014. Accessed December 1, 2014. <http://www.trend.az/casia/kyrgyzstan/2326511.html>.
- "Gazprom Kyrgyzstan to Provide Reliable Gas Supply to Kyrgyz Republic." *Gazprom official website*, August 27, 2014. Accessed January 15, 2015 <http://www.gazprom.com/press/news/2014/august/article199715/>.
- "Gas Purchases." *Gazprom official website*, n.d. Accessed June 1, 2015. <http://www.gazprom.com/about/production/central-asia/>.
- Gheorghe, Adrian, and Liviu Muresan. *Energy Security International and Local Issues, Theoretical Perspectives, and Critical Energy Infrastructures*. Dordrecht: Springer Netherlands, 2011.
- Goldemberg, Jose. "Energy Choices toward a Sustainable Future." *Environment: Science and Policy for Sustainable Development*, 2007. <http://www.environmentmagazine.org/Archives/Back%20Issues/December%202007/Goldemberg-full.html>.
- Goldthau, Andreas, and Jan Martin Witte. "From Energy Security to Global Energy Governance." *Journal of Energy Security*, 2010. [energy-governance&catid=103:energysecurityissuecontent&Itemid=358](http://www.energy-governance.com/content/103/energysecurityissuecontent/Itemid=358).
- Golubev, G.N. *Systems View of the Water Management in Central Asia* (in Russian) (Moscow State University, Faculty of Geography, 2001). In "Revisiting Water Issues in Central Asia: Shifting from Regional Approach to National Solutions." By Nariya Khasanova, *Central Asia Fellowship Papers*, No. 6, October 2016. Accessed June 1, 2015. <https://app.box.com/s/fornzf5490xyou1juaw0>.
- Gould, Tim, Isabel Murray, Jonathan Sinton, Dagmar Graczyk, and Christopher Segar. "Perspectives on Caspian Oil and Gas Development." *IEA Directorate of Global Energy*

- Dialogue*, 2008. Accessed June 1, 2013.
http://www.asiacentral.es/docs/caspian_perspectives_iaa_dec08.pdf.
- Government of Kyrgyz Republic. *Premier-Minister J. Otorbaev Poruchil MinenerGOPromu Zavershit Vse Podgotovitelnie Raboti k Otopitelnomu Period Strogo v Srok (Prime Minister Otorbaev Instructed MinenerGOProm to Complete All Preparatory Works for the Heating Period Strictly on Time)*. Bishkek: Gov.kg, 2014. Accessed December 10, 2014. <http://www.gov.kg/?p=38756>.
- Government of the Republic of Kazakhstan. *50 Enterprises Consume 40 Percent of all Energy in Kazakhstan*. Astana: Government.kz, 2014. Accessed October 1, 2014.
<http://ru.government.kz/index.php/en/novosti/17316-50-enterprises-consume-40-percent-of-all-energy-in-kazakhstan.html>.
- Government of the Republic of Kazakhstan, *Koncepciya Razvitiya Gazovogo Sektora Respubliki Kazaxstan do 2030 Goda (Gas Sector Development Concept of the Republic of Kazakhstan until the Period of 2030)*, Online.zakon.kz, December 5, 2014,
http://online.zakon.kz/Document/?doc_id=31641775.
- Government of the Republic of Turkmenistan. *Towards New Paradigm of Global Energy Space*. Ashgabat: State News Agency of Turkmenistan, 2011. Accessed June 5, 2014.
http://turkmenistan.gov.tm/_eng/?id=105.
- Government of the Republic of Uzbekistan. *Coal Industry*. Tashkent: Governmental Portal of the Republic of Uzbekistan, n.d. Accessed June 5, 2014.
<http://www.gov.uz/en/helpinfo/energy/2680>.
- Government of the Republic of Uzbekistan. *Energy Resources of Uzbekistan*. Tashkent: Governmental Portal of the Republic of Uzbekistan, n.d. Accessed July 1, 2014.
<http://www.gov.uz/en/helpinfo/energy/10004>.
- Government of the Republic of Uzbekistan. *Investments*. Tashkent: Governmental Portal of the Republic of Uzbekistan, n.d. Accessed October 1, 2014.
<http://www.gov.uz/en/business/invest/1175>.
- Gunningham N. "Regulation, Economic, Instrument, and, Sustainable, Energy." *Climate and Environmental Governance Network Working Paper 12* (2012).
- Gurt, Marat. "Turkmenistan Stifles U.S. Gas Plans." *The Moscow Times*, June 3, 2000. Accessed May 15, 2014. <http://www.themoscowtimes.com/news/article/turkmenistan-stifles-us-gas-plans/262464.html>.
- Haas, Peter M. "Introduction: Epistemic Communities and International Policy Coordination." *International Organization* 46, no. 1 (1992): 1–35.
doi:10.1017/S0020818300001442.
- Hasanov, N. "Negotiations on Trans-Caspian Gas Pipeline Held Successfully in Brussels." *TREND*, March 10, 2012. Accessed June 1, 2014.
<http://en.trend.az/capital/energy/2001834.html>.
- Hawkins, Darren G. *Delegation and Agency in International Organizations*. Cambridge, UK: Cambridge University Press, 2006.

- Head of Sales Department of “Buxorogaz”. Personal Interview. Bukhara, Uzbekistan, June 23, 2013.
- Heathershaw, John. “Tajikistan Amidst Globalization: State Failure or State Transformation?” *Central Asian Survey* 30, no. 1 (March 2011).
- Helmer, John. “Tajik Aluminium Case Gets Nearer Judgment.” *Dances with Bears*, 2 August 2008. In “Tajikistan Amidst Globalization: State Failure or State Transformation?” by John Heathershaw. *Central Asian Survey* 30, no. 1 (March 2011).
- Henderson, Creelea. “Shifting Sands in Central Asia: Geopolitics of Natural Gas Flows.” *Perspective* 20, no. 2 (February 2010). Accessed October 5, 2013. <http://www.bu.edu/iscip/Vol20/henderson.html>.
- Hippel, David V., Tatsujiro Suzuki, James St. Williams, Timothy Savage, and Peter Hayes. “Energy Security and Sustainability in Northeast Asia.” *Energy Policy* 39, no. 11 (2011): 6719–6730. doi:10.1016/j.enpol.2009.07.001.
- Huasheng, Zhao. “The Shanghai Cooperation Organization at 5: Achievements and Challenges Ahead.” *China and Eurasia Forum Quarterly* 4, no. 3 (2006): 99–118.
- Hubinger, Vaclav. “Southern Corridor: A Strategy for Sustainable Energy Cooperation with Central Asia.” *EUCAM Watch*, no. 4 (2009).
- Institute of Strategic Studies and Analysis. *Centralnaya Aziya. Geopolitika i Ekonomika Regiona (Central Asia. Geopolitics and Economy of the Region)*. 2010. http://www.isoa.ru/docs/central_asia-book.pdf.
- “International Cooperation in the Turkmenistan’s Oil and Gas Sector: Achievements and Prospects.” *State News Agency*, November 20, 2014. Accessed March 1, 2015. <http://tdh.gov.tm/en/official-news-2/12015-2014-11-20-16-17-00>.
- International Crisis Group. *Central Asia: Decay and Decline*. Asia Report 201, 2011.
- International Energy Agency. *Electricity and Heat for 2012*. Paris: International Energy Agency, n.d. Accessed January 15, 2015. <http://www.iea.org/statistics/statisticssearch/report/?year=2012&country=KAZAKHstAN&product=ElectricityandHeat>.
- International Energy Agency. *Energy Efficiency Governance: Handbook*. Paris: International Energy Agency, 2010. Accessed April 7, 2015. http://www.iea.org/publications/freepublications/publication/gov_handbook-1.pdf.
- International Energy Agency. *Fossil fuel Consumption Subsidy Rates as a Proportion of the Full Cost of Supply 2013*. Paris: International Energy Agency, n.d. Accessed January 10, 2015. <http://www.iea.org/subsidy/index.html>.
- International Energy Agency. *Kazakhstan: Oil for 2012*. Paris: International Energy Agency, n.d. Accessed January 11, 2015. <http://www.iea.org/statistics/statisticssearch/report/?country=KAZAKHstAN&product=oil&year=2012>.

- International Energy Agency. *Optimizing Russian Natural Gas. Reform and Climate Policy*. Paris: International Energy Agency, 2006. Accessed October 31, 2012.
<http://www.iea.org/publications/freepublications/publication/russianguas2006.pdf>.
- International Energy Agency. *Statistics: Balances for 2012 in Thousand tons of oil Equivalent (ktoe) on a Net Calorific Value Basis*. Paris: International Energy Agency, n.d. Accessed January 15, 2015.
<http://www.iea.org/statistics/statisticssearch/report/?country=KAZAKHstAN&product=balances&year=2012>.
- International Institute for Political Expertise. “Investment Opportunities in Turkmenistan: Political Risks Analysis.” 2011. Accessed April 1, 2015.
http://www.minchenko.ru/netcat_files/File/Print_eng_Preview.pdf.
- International Renewable Energy Agency. *Renewable Energy Country Profile—Kazakhstan*. Abu Dhabi: IRENA, n.d. Accessed December 1, 2014.
<http://www.irena.org/REmaps/countryprofiles/asia/Kazakhstan.pdf>.
- International Renewable Energy Agency. *Renewable Energy Country Profile—Turkmenistan*. Abu Dhabi: IRENA, n.d. Accessed December 1, 2014.
<http://www.irena.org/REmaps/countryprofiles/asia/Turkmenistan.pdf>.
- International Renewable Energy Agency. *Renewable Energy Country Profile—Uzbekistan*. Abu Dhabi: IRENA, n.d. Accessed December 5, 2014.
<http://www.irena.org/REmaps/countryprofiles/asia/Uzbekistan.pdf>.
- International Scientific Conference Materials, The SCO in Quest of New Perception of Security*. Almaty: Kazakhstan Institute for Strategic Studies, 2008.
- Izimov, Ruslan. Personal Interview, Senior Research Fellow at Kazakhstan Institute for Strategic Studies under the President of the Republic of Kazakhstan. Almaty, Kazakhstan, August 25, 2013.
- Jackson, Robert St., and Georg Sørensen. *Introduction to International Relations: Theories and Approaches*. Oxford: Oxford University Press, 3rd ed. 2007.
- Jakeev, Murat. “Tarifi na Elektroenergiyu i Gaz Budut Rasti – Prezident RK (Tariffs for Electricity and Gas will Continue to Increase – President of RK).” *Kazinform*, July 2, 2014. Accessed August 1, 2014. <http://inform.kz/rus/article/2674096>.
- Janusz, Barbara. “The Caspian Sea Legal Status and Regime Problems.” *Chatham House*, August 2005. Accessed May 23, 2015
<https://www.chathamhouse.org/sites/files/chathamhouse/public/Research/Russia%20and%20Eurasia/bp0805caspian.pdf>.
- Jarosiewicz, Alesandra. “A Chinese Tour De Force in Central Asia.” *OSW—Centre for Eastern Studies*, September 18, 2013. Accessed October 5, 2014.
<http://www.osw.waw.pl/en/publikacje/analyses/2013-09-18/a-chinese-tour-de-force-central-asia>.
- Jeffries, Ian. *The Countries of the Soviet Union at the Turn of the Twenty-first Century. The Baltic and European States in Transition*. London: Routledge, 2004.

- Jensen, Victor. "Hydroelectric Dams and Conflict in Central Asia." *Central Asia Regional Data Review* 1, no. 1 (September 2009).
- Joffe, George. "Threats to Energy Security." *Center for International Studies University of Cambridge* (n.d.).
- Johns, Lionel S. et al. *Technology and Soviet Energy Availability*. Washington: U.S. Government Printing, 1981.
- Jonboboev, Sunnatullo. Personal Interview, Senior Research Fellow at the University of Central Asia in Tajikistan. Astana, Kazakhstan, May 25, 2014.
- Kahler, Miles. *Networked Politics: Agency, Power, and Governance*. Ithaca: Cornell University Press, 2009.
- Kalybekova, Asel. "Kyrgyzstan: Is Grazprom Deal a Blessing or Curse for Bishkek?" Eurasianet.org, July 31, 2013. Accessed September 1, 2014 <http://www.eurasianet.org/node/67327>.
- Karabalin, U. "Voloviy Obyom Dobichi Neftekondensata k 2030 Godu Sostavit Poryadka 112 mln. Ton v God" (Gross Production of the Oil Condensate will Reach 112 mln tonnes by 2030). Government of the Republic of Kazakhstan, 2014. Accessed October 5, 2014. <http://www.government.kz/index.php/ru/novosti/16672-valovyy-ob-em-dobychi-neftekondensata-k-2030-godu-sostavit-poryadka-112-mln-tonn-v-god-u-karabalin.html>.
- Karibekov, Ernest. Personal Interview, Head of International Public Fund "Research Institute for the Central Asian water and water-energy resources problem studies." Bishkek, Kyrgyzstan, February 4, 2014.
- Karibekov, Ernest. "Est li Rinok Elektroenergii v Kirgizstane, Chast 1 (Is There an Energy Market in Kyrgyzstan, Part 1)." *Analitika*, January 17, 2014. Accessed September 1, 2014. <http://analitika.akipress.org/news:4952>.
- Karibekov, Ernest. "Plyus Elektrifikacii Vsey Strane. Stranam Centralnoy Azii Nujna Novaya Model Edinoy Energosistemi (Countrywide Electrification Pluses. Central Asian Countries Need New Model of the Unified Energy System)." *Centralasia.ru*, June 3, 2012. Accessed August 5, 2014. <http://www.centrasia.ru/newsA.php?st=1338670560>.
- Karns, Margaret P., and Karen A. Mingst. *International Organizations: The Politics and Processes of Global Governance*. Boulder, Colo: Lynne Rienner Publishers, 2nd ed. 2010.
- Kaukenov, Adil. "Shanhayskaya Organizaciya Sotrudnichestva – Burnaya Deyatel'nost ili Ee Imitaciya? (The Shanghai Cooperation Organization – Flurry Activity or Its Imitation?)." *ARKZ*, July 18, 2013. Accessed September 5, 2014. <http://arkz.info/news/shanhayskaya-organizaciya-sotrudnichestva-burnaya-deyatelnost-ili-ee-imitaciya>.
- "Kazaxstanu Nujen Institute po Voprosam 'Zelenoy' Energetiki (Kazakhstan Needs an Institute on 'Green' Energy Issues)." *Kazenergy*, October 11, 2013. Accessed March 5, 2014. <http://kazenergy.com/ru/press/2011-04-21-10-24-20/11309-----qq--.html>.

- “Kazakhstan – an End to ‘Kazakhgate’.” *OSW Center for Eastern Studies*, August 18, 2010. Accessed April 15, 2015. <http://www.osw.waw.pl/en/publikacje/analyses/2010-08-18/kazakhstan-end-to-kazakhgate>.
- Keene, Eli. “Solving Tajikistan’s Energy Crisis.” *Carnegie Endowment for International Peace*, March 25, 2013. Accessed June 17, 2014. <http://carnegieendowment.org/2013/03/25/solving-tajikistan-s-energy-crisis>.
- Kelly, Robert. “The Six-Party Talks As a Game Theoretic ‘Stag-Hunt’ (1): N. Korea is the Stag.” *Asian Security Blog*, April 26, 2010. Accessed January 29, 2014. <https://asiansecurityblog.wordpress.com/2010/04/29/the-six-party-talks-as-a-game-theoretic-stag-hunt-2-china-likes-the-rabbit-too-much/>.
- Keohane, Robert O., and Joseph S. Nye. *Power and Interdependence: World Politics in Transition*, 3rd ed. Boston: Little, Brown, 2001.
- Khasanova, Nariya. “Revisiting Water Issues in Central Asia: Shifting from Regional Approach to National Solutions.” *Central Asia Fellowship Papers*, No. 6, October 2016. Accessed June 1, 2015. <https://app.box.com/s/fornzf5490xyou1juaw0>.
- Klimenko, Ekaterina. “Central Asia as a Regional Security Complex.” *Central Asia and Caucasus Press* 12, no. 4 (2011).
- “Kirgiziya Virazila Sojalenie, Chto Uzbekistan ne Jelaet Sotrudnichat v Voprosax Stroitelstva GES (Kyrgyzstan Regrets that Uzbekistan is Not Willing to Cooperate in Building HPP).” *Regnum*, February 5, 2013. Accessed June 10, 2014. <http://www.regnum.ru/news/1621466.html#ixzz2vXzxCrn>.
- Konirova, Kulpash. “Kaspiy Stanet Odnim iz Klyuchevix Regionov Mirovogo Neftyanogo Rinka (Caspian Region Will Turn into Key World Oil and Gas Market).” *Kazenergy* 4, no. 59 (2013). Accessed February 5, 2014. <http://kazenergy.com/en/4-59-2013/11549-2013-10-30-08-47-58.html>.
- Kosnazarov, Daniyar. Head of the Department for Central Asia and Caucasus Studies, The Library of the First President of the Republic of Kazakhstan – The Leader of the Nation, Personal Interview. Almaty, Kazakhstan, March 18, 2014.
- Kostenko, Julia. “Gazprom: Dreams Don’t come true?” *24.kg news agency*, September 10, 2014. Accessed December 1, 2014. <http://www.eng.24.kg/economics/172141-news24.html>.
- Kouzmitch, Vladimir V. “Strengthening Cooperation of Central-Asian Countries in Using Advanced Technologies in Energy Efficiency and Renewable Energy Sources.” Project of the United Nations Economic Commission for Europe, 2013. Accessed May 15, 2015. http://www.unece.org/fileadmin/DAM/energy/se/pdfs/gee21/projects/AdvTech_IncreasingCooperation.pdf.
- Kravcov, N. “V Voprosax Energobezopasnosti Nam ne Oboytis Bez Sosedey, Kak i Im Bez Nas (To Ensure Energy Efficiency We Need Our Neighbours as well as They Need Us).” *Fuel Energy Sector Transparency Initiative in Kyrgyz Republic*, 2015. Accessed February 15, 2015. http://www.energoforum.kg/index.php?act=view_material&id=447.

- Kulmagambetov, Rinat. "Energiya Kaspiyskogo Shelfa (The Energy of the Caspian Shelf)." *Kazenergy*, June 28, 2013. Accessed December 1, 2014. <http://kazenergy.com/en/component/content/article/47-2011-04-18-15-36-46/9844-2013-06-28-04-52-45.html>.
- Laldjebaev, Murodbek. "The Water–Energy Puzzle in Central Asia: The Tajikistan Perspective." *International Journal of Water Resources Development* 26, no. 1 (2010). doi:10.1080/07900620903391812.
- Lesage, Dries, Thijs van de Graaf, and Kirsten Westphal. *Global Energy Governance in a Multipolar World*. Farnham, Surrey, England: Ashgate, 2010.
- Livingston, David and Deborah Gordon. "EU Energy Exchange: Balancing Security, Economy, and Climate Goals." *Carnegie Energy and Climate Program*, August 27, 2014. Accessed June 1, 2015. http://carnegieendowment.org/files/EU_EX%20Conference%20Report-Final%20Dft-SS%20NP-CTG-WEB.pdf.
- "Lukashenko Napravilsya v Kazaxstan, Chtobi Podpisat ne Sovsem Tot Dogovor o EAES, na Kotoriy Raschitivala Belarus (Lukashenko is Heading to Kazakhstan to Sign not the Same Agreement on the EEU that Belarus was Expecting)." May 28, 2014. <http://news.tut.by/politics/400916.html>.
- Majeski, Stephen J., and Shane Fricks. "Conflict And Cooperation in International Relations." *Journal of Conflict Resolution* 39, no. 4 (December 1995). doi:10.1177/0022002795039004002.
- Mamadova, Sevinj. "Changing Market Dynamics In Central Asia: Declining Russian Interests And Emerging Chinese Presence – Analysis." *Caspian Center for Energy and Environment*, March 6, 2015. Accessed May 25, 2015. <http://www.eurasiareview.com/06032015-changing-market-dynamics-in-central-asia-declining-russian-interests-and-emerging-chinese-presence-analysis/>.
- Marat, Erica. "Criminalization of the Kyrgyz State before and after the Tulip Revolution." *China and Eurasia Forum Quarterly* 6, no. 2 (2008).
- Marketos, Thrassy N. *China's Energy Geopolitics: The Shanghai Cooperation Organization and Central Asia*. Abingdon, Oxon: Routledge, 2009.
- Marks, Michael P. "The Prison as Metaphor: Recasting the 'Dilemma' of International Relations." *Alternatives: Global, Local, Political* 26, no. 3 (July/August 2001).
- Mateev, U. A., and G. B. Anderson. "Energetika Kirgizskoy Respubliki i Puti Ee Razvitiya (Energy Sector of Kyrgyz Republic and Its Development Ways)." *REFORMA*, February 1999, 1–10. Accessed February 1, 2014. http://journals.manas.edu.kg/reforma/oldarchives/1999-2-2/8_1540-3762-1-PB.pdf.
- Mattli, Walter. *The Logic of Regional Integration. Europe and Beyond*. Cambridge: Cambridge University Press, 1999.
- Meadowcroft, James. "What About the Politics? Sustainable Development, Transition Management, and Long Term Energy Transitions." *Policy Sciences* 42 (2009): 323–340. doi:10.1007/s11077-009-9097-z.

- “MID Kirgizii: Uzbekistan ne Zaxotel Uchastvovat v Obsujdenii Proektov Kirtizskix GES (MoFA of Kyrgyzstan: Uzbekistan Did Want to Participate in the Discussion of the HPP Projects of Kyrgyzstan).” *Regnum*, October 18, 2013. Accessed September 20, 2014. <http://www.regnum.ru/news/1721689.html#ixzz2vWqv1oyC>.
- Ministry of Defense of the Republic of Kazakhstan. *Strategy “Kazakhstan-2050”: New Political Course of the Established State*. Astana: Address by the President of the Republic of Kazakhstan, Nursultan Nazarbaev, 2012. Accessed July 1, 2014. <http://www.mod.gov.kz/mod-en/index.php/address-by-the-president-of-the-republic-of-kazakhstan-leader-of-the-nation-nazarbayev-strategy-kazakhstan-2050-new-political-course-of-the-established-state>.
- Ministry of Energy and Industry of the Republic of Tajikistan. *The Construction of Line Transfer Electricity 220 kV Lolazor-Khalton*. Dushanbe: Minenergoprom.tj, n.d. Accessed September 15, 2014. http://www.minenergoprom.tj/view_liniyae.php?id=3.
- Ministry of Environmental Protection of the Republic of Kazakhstan. *Sostavlenie Ekologo-Energeticheskix Reytingov Predpriyatiy Kazaxstana na 2013 (Calculating Ecological and Energy Ratings of Enterprises in Kazakhstan for 2013)*. Astana: Report no. 07-1-223, n.d. Accessed May 25, 2015. <http://energo.gov.kz/uploads/files/2015/03/%D0%9E%D1%82%D1%87%D0%B5%D1%82%20%D0%B7%D0%B0%D0%BA%D0%BB%D1%8E%D1%87%D0%B8%D1%82%D0%B5%D0%BB%D1%8C%D0%BD%D1%8B%D0%B9%20%D1%80%D0%B5%D0%B9%D1%82%D0%B8%D0%BD%D0%B3%D0%B8.PDF>.
- Ministry of Foreign Affairs of the Republic of Kazakhstan. *The Customs Union and the Common Economic Space of the Republic of Belarus, the Republic of Kazakhstan and the Russian Federation*. Astana: Mfa.kz, 2015. Accessed January 29, 2015. <http://www.mfa.kz/index.php/en/foreign-policy/integration-processes/customs-union>.
- Ministry of Foreign Affairs of the Republic of Tajikistan. *The Energy Sector of the Republic of Tajikistan*. Dushanbe: Mfa.tj, n.d. Accessed September 5, 2014. <http://mfa.tj/en/energy-sector/the-energy-sector-of-rt.html>.
- Ministry of Foreign Economic Relations, Investments and Trade of the Republic of Uzbekistan. *Statistics*. Tashkent: Mfer.uz, n.d. Accessed September 10, 2014. <http://www.mfer.uz/en/news/statistics/>.
- Ministry of Industry and New Technologies of the Republic of Kazakhstan. *Malie Hidroelektrostancii (Small Hydropower plants)*. Astana: Mint.gov.kz, n.d. Accessed March 15, 2013. <http://www.mint.gov.kz/index.php?id=203&lang=ru>.
- Ministry of Oil and Gas of the Republic of Kazakhstan. *Neftyanaya Promishlennost (Oil Industry)*. Astana: Mgm.gov.kz, n.d. Accessed March 10, 2014. <http://mgm.gov.kz/news/42>.
- Ministry of Oil Industry and Mineral Resources of Turkmenistan. *Ministry*. Ashgabat: Minenergo.gov.tm, n.d. Accessed June 1, 2014. <http://www.minenergo.gov.tm/index.php/7-news/188-ministerstvo>

- Mirimanova, Natalia. "Interview with Rainer Behnke." *Europe-Central Asia Monitoring*, 2009. Accessed March 5, 2014. http://www.eucentralasia.eu/fileadmin/PDF/Commentaries/Interview_INOGATE.pdf.
- Moran, Daniel, and James A. Russell. *Energy Security and Global Politics: The Militarization of Resource Management*. London: Routledge, 2009.
- Mukhammadiev, Sherzod. Personal Interview, Ministry of Agriculture of the Republic of Uzbekistan. Tashkent, Uzbekistan, June 23, 2013.
- Müller-Kraenner, Sascha. *Energy Security: Re-Measuring the World*. London: Earthscan, 2008.
- "Neftegazovaya Otrasl Obespechivaet 25% VVP RK: Dobicha Nefti v Kazaxstane Virosla Bole Chem v Tri Raza (Oil and Gas Industry Provides 25 Percent of GDP of Kazakhstan: Oil Production in Kazakhstan Increased Three Folds)." *Kapital.kz*. 2013. Accessed March 5, 2014. <http://kapital.kz/economic/21860/neftegazovaya-otrasl-obespechivaet-25-vvp-rk.html>.
- "Neytralitet Turkmenistana: Politika Mira, Dobrososedstva i Razvitiya (Neutrality of Turkmenistan: Politics of Peace, Good Neighbourhood and Development)." *Ministry of Oil and Gas Industry and Mineral Resources Journal*. Accessed March 20, 2015. <http://www.oilgas.gov.tm/neftegazovyj-sektor/item/316>.
- Nowak, Martin, and Karl Sigmund. "A Strategy of Win-stay, Lose-shift That Outperforms Tit-for-tat in the PD Game." *Nature* 364 (July 1993). doi:10.1038/364056a0.
- Nurusheva, Dinara. Vice – President Kazakhstan Center for Humanitarian and Political Trends, Personal Interview. Almaty, Kazakhstan, April 20, 2014.
- Nuttall, William J., and Devon L. Manz. "A New Energy Security Paradigm for the Twenty-first Century." *EPRG Working Paper*, 2008. doi:10.1016/j.techfore.2008.02.007.
- "Obshiy Rinok Nefti i Gaza Belarusi, Rossii i Kazakhstana Mojet Bit Sformirovan k 1 Yanvary 2015 Goda – Minister EEK (Common Oil and Gas Market of Belarus, Russia, and Kazakhstan Could be Formed by January 1, 2015)." *Belta*. February 6, 2013. Accessed April 5, 2014. http://www.belta.by/ru/all_news/economics/Obschij-rynok-nefti-i-gaza-Belarusi-Rossii-i-Kazaxstana-mozhet-byt-sformirovan-k-1-janvarja-2015-goda---ministr-EEK_i_623314.html.
- "Obespechenie Globalnoy Energobezopasnosti – Faktor Ustoychivogo Razvitiya (Global Energy Security is a Guarantor of Sustainable Development)." *Ministry of Oil and Gas Industry and Mineral Resources Journal*, May 28, 2015. Accessed June 1, 2015. <http://www.oilgas.gov.tm/publikatsii/item/435>.
- Ogutcu, Mehmet, and Ma Xin. "Geopolitics of Energy: China and the Central Asia." *Insight Turkey* 9, no. 4 (n.d.): 44–62. Accessed September 20, 2014. http://files.setav.org/uploads/Pdf/ogutcu_ma.pdf.
- Oldberg, Ingmar. *The Shanghai Cooperation Organization: Powerhouse or Paper Tiger?* Stockholm: Swedish Defence Research Agency, R-2301-SE, 2007. Accessed July 20, 2013. http://www.foi.se/ReportFiles/foir_2301.pdf.

- Olimov, Muzaffar. Personal Interview, Senior Scientist at the Tajik Academy of Sciences Institute of Language, Literature, and Oriental Studies. Astana, Kazakhstan, November 17, 2014.
- OSHPC Barki Tojik. *Techno-economic Assessment Study for Rogun Hydroelectric Construction Project*. World Bank, 2014. Accessed October 5, 2014. http://www.worldbank.org/content/dam/Worldbank/document/eca/central-asia/TEAS_Executive%20Summary_Final_eng.pdf.
- “Osnovnie Napravleniya Razvitiya Energeticheskoy Diplomatii Turkmenistana na Sovremennom Etape (Turkmenistan’s Energy Diplomacy: Its Main Development Directions in the Contemporary World).” *Ministry of Oil and Gas Industry and Mineral Resources Journal*, January 21, 2015. Accessed March 4, 2015. <http://www.oilgas.gov.tm/neftegazovyj-sektor/item/59>.
- Otorbaev, Joormat. *Problemi i Potencial Razvitiya Elektroenergetiki v Kirgizskoy Respubliki (Problems and Perspectives for the Development of Power Sector in Kyrgyzstan)*. Government of Kyrgyz Republic, 2014. Accessed December 4, 2014. <http://www.gov.kg/?p=41665>.
- Pacheco, Jorge M., Francisco C. Santos, Max O. Souza, and Brian Skyrms. “Evolutionary Dynamics of Collective Action in N-Person SH Dilemmas.” *Biological Sciences* 276, no. 1655 (January 2009). doi:10.1007/978-3-0348-0122-5_7.
- Padgett, Stephen. “External European Union Governance in Energy: Full Research Report.” *RES-000-22-2562*, Swindon: ESRC, 2009.
- Pahre, Robert. “Multilateral Cooperation in an Iterated PD.” *Journal of Conflict Resolution* 38, no. 2 (June 1994).
- Pant, Pushpesh. *International Relations in 21st Century*. India: Tata McGraw-Hill Education, 2011.
- Pascual, Carlos, and Jonathan Elkind. *Energy Security Economics, Politics, Strategies, and Implications*. Washington, D.C.: Brookings Institution Press, 2010.
- Pashkova, S. “Prezident Kazaxstana Priznalsya, Chto ne Verit v Alternativnuyu Energetiku (President of Kazakhstan Confessed that He Does not Believe in Alternative Energy).” *Vlast.kz*, 2014. Accessed December 1, 2014. http://vlast.kz/article/prezident_kazahstana_priznalsja_cho_ne_verit_v_alternativnuju_energetiku-7678.html#gsc.tab=0&gsc.q=%D1%84%D0%B0%D1%80%D1%85%D0%BE%D0%B4&gsc.sort=.
- Payrouse, Sebastien. “Central Asian Power Grid in Danger.” *CACI Analyst*, 2009. Accessed July 20, 2013. <http://old.cacianalyst.org/?q=node/5232/print>.
- Peixe, Joao. “Tajikistan to Proceed with Rogun Hydroelectric Dam.” *Oilprice*, August 28, 2011. Accessed May 1, 2014. <http://oilprice.com/Latest-Energy-News/World-News/Tajikistan-to-Proceed-with-Rogun-Hydroelectric-Dam.html>.
- Picciotto, Sol. “Regulatory Networks and Global Governance.” *St. G. Hart Legal Workshop*, 2006.

- Pirani, Simon. "Central Asian and Caspian Gas Production and the Constraints on Export." *Oxford Institute for Energy Studies*, 2012. Accessed April 15, 2015.
http://www.oxfordenergy.org/wpcms/wp-content/uploads/2012/12/NG_69.pdf.
- Poocharoen, Ora-orn, and Benjamin K. Sovacool. "Exploring the Challenges of Energy and Resources Network Governance." *Energy Policy* 42 (2012): 409–418.
- "Posledovatel'niy Rost Znachimosti Turkmenistana na Mejdunarodnom Gazovom Rinke (Increasing Role of Turkmenistan in the International Gas Market)." *Ministry of Oil and Gas Industry and Mineral Resources Journal*, April 28, 2015. Accessed May 5, 2015.
<http://www.oilgas.gov.tm/neftegazovyyj-sektor/item/402>.
- President of the Republic of Tajikistan. *Annual address of the President of the Republic of Tajikistan Emomali Rahmon to the Majlisi Oli of the Republic of Tajikistan*. Dushanbe: President of the Republic of Tajikistan, 2014. Accessed December 1, 2014.
<http://www.prezident.tj/en/node/6600>.
- President of the Republic of Tajikistan. *Annual address to the Majlisi Oli of the Republic of Tajikistan*. Dushanbe: President of the Republic of Tajikistan, 2008. Accessed January 5, 2014. <http://www.prezident.tj/en/node/2191>.
- President of the Republic of Tajikistan. *The Annual Message to the Majlisi Oli of the Republic of Tajikistan*. Dushanbe: President of the Republic of Tajikistan, 2011. Accessed June 5, 2014. <http://www.prezident.tj/en/node/2189>.
- "President of Turkmenistan Gurbanguly Berdymukhamedov Gave a Start-up to the Second-Phase Development of the Supergiant Deposit 'Galkynysh'." *State News Agency of Turkmenistan*, May 8, 2014. Accessed December 5, 2014.
<http://tdh.gov.tm/en/politics/news/10010-2014-05-08-03-52-22>.
- Price, Richard. "Transnational Civil Society and Advocacy in World Politics." *World Politics* 55, no. 4 (2003): 579-606. doi:10.1353/wp.2003.0024.
- Prime Minister of the Republic of Kazakhstan. *BRK Videlil 900 mln Dollarov na Realizaciyu Proektov v Ramkax Vzaimodeystviya Stran ShOS* (KDB Allocated 900 Million USD for Projects Realization Within the Framework of the SCO Member States Cooperation). Astana: Prime Minister's Official Website, 2014. Accessed December 1, 2014.
<http://www.primeminister.kz/news/show/70/brk-vydelil-900-mln-dollarov-na-realizatsiju-proektov-v-ramkah-vzaimodejstvija-stran-shos-/11-09-2014>.
- Proedrou, Filippos. *EU Energy Security in the Gas Sector Evolving Dynamics, Policy Dilemmas and Prospects*. Aldershot: Ashgate, 2012.
- Protocol of the Workshop for the Representatives of Water and Energy Authorities of the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan and the Republic of Uzbekistan Related to Water and Energy Use Issues in the Forthcoming 1998/9 Fall-Winter Season and 1999 Vegetation Period*. Accessed May 20, 2015. 1999.
<http://www.ce.utexas.edu/prof/mckinney/papers/aral/agreements/Annual-Protocol-99.pdf>.
- "Providing Security of Supply Efficiently Using Market Mechanisms. Industry Proposal for a Decentralized Capacity Market." 2014.
[https://www.bdew.de/internet.nsf/res/595D1657AAB9ED23C1257D5E00314BAB/\\$file/](https://www.bdew.de/internet.nsf/res/595D1657AAB9ED23C1257D5E00314BAB/$file/)

- Branchenvorschlag_fuer_einen_dezentralen_Leistungsmarkt_Kurzbeschreibung_en_final.pdf.
- Quackenbush, Stephen. "The Rationality of Rational Choice Theory." *International Interactions* (2004): 87–107. doi:10.1080/03050620490462595.
- Rai, Shirin. "Gendering Global Governance." *International Feminist Journal of Politics* 6, no. 4 (2004): 579–601. doi:10.1080/1461674042000283345.
- Rakhmatullaev et al. "Water Reservoirs, Irrigation and Sedimentation in Central Asia." *Environmental Earth Sciences* 68, no. 4 (2013). In "Revisiting Water Issues in Central Asia: Shifting from Regional Approach to National Solutions." By Nariya Khasanova, *Central Asia Fellowship Papers*, no. 6, October 2016. Accessed June 1, 2015. <https://app.box.com/s/fornzf5490xyou1juaw0>.
- Rapoport, Anatol, Albert M. Chammah, and Carol J. Orwant. *PD. A Study in Conflict and Cooperation*. 1965.
- Rashidova, Bela. Head of Economic Studies Department, at Kazakhstan Institute for Strategic Studies under the President of the Republic of Kazakhstan, Personal Interview. Almaty, Kazakhstan, August 8, 2013.
- Raustiala, Kal, and David G. Victor. "The Regime Complex for Plant Genetic Resources." *International Organization* 58 (2004): 277–309. doi:10.1017/S0020818304582036.
- Regional Economic Cooperation in Central Asia. "Electric Energy." *Final Report RETA 5818*, 2000. <http://www.docstoc.com/docs/19688087/Electric-Energy#top>.
- Regional Environmental Centre for Central Asia. *About CAREC*. Almaty, n.d. Accessed April 5, 2014. <http://www.carecnet.org/about-carec/?lang=en>.
- Regional Environmental Centre for Central Asia. *CAREC's Key Contributions*. Almaty, n.d. Accessed April 25, 2014. <http://www.carecnet.org/about-carec/carec's-key-contributions/?lang=en>.
- Regional Environmental Centre for Central Asia. *Capacity Building for Scenario Development: Climate Change and Water-Food-Energy Security in Central Asia*. n.d. Accessed April 15, 2014. <http://www.carecnet.org/programmes-and-activities/climate-change-and-sustainable-energy/capacity-building-for-scenario-development-climate-change-and-water-food-energy-security-in-central-asia/?lang=en>.
- Regional Environmental Centre for Central Asia. *Central Asian Initiative on SD*. n.d. Accessed April 20, 2014. <http://www.carecnet.org/international-processes/central-asian-initiative-on-sd/?lang=en>.
- Regional Environmental Centre for Central Asia. *Climate Change and Sustainable Energy*. n.d. Accessed April 10, 2014. <http://www.carecnet.org/programmes-and-activities/climate-change-and-sustainable-energy/?lang=en>.
- Regional Environmental Centre for Central Asia. *Gap Analysis in the Area of Climate Change and Energy Efficiency in Central Asia*. n.d. Accessed April 25, 2014. <http://www.carecnet.org/programmes-and-activities/climate-change-and-sustainable-energy/gap-analysis-in-the-area-of-climate-change-and-sustainable-energy/?lang=en>.

- Regional Environmental Centre for Central Asia. *Integrated Approach for the Development of Low Carbon Development Strategies in Central Asia*. n.d. Accessed June 10, 2014. <http://www.carecnet.org/programmes-and-activities/climate-change-and-sustainable-energy/integrated-approach-for-the-development-of-low-carbon-development-strategies-in-central-asia/?lang=en>.
- Regional Environmental Centre for Central Asia. *Planning for Energy Security and Sustainability in Central Asia*. n.d. Accessed June 15, 2014. <http://www.carecnet.org/programmes-and-activities/climate-change-and-sustainable-energy/planning-for-energy-security-and-sustainability-in-central-asia-envsec-1-and-2/?lang=en>.
- Regional Environmental Centre for Central Asia. *Programmes*. n.d. Accessed April 5, 2014. <http://www.carecnet.org/programmes-and-activities/?lang=en>.
- Regional Environmental Centre for Central Asia. *Promoting Adaption and Mitigation Strategies on Climate Change in Central Asia*. n.d. Accessed June 5, 2014. <http://www.carecnet.org/programmes-and-activities/climate-change-and-sustainable-energy/promotion-of-mitigation-and-adaptation-strategies-on-climate-change-in-central-asi/?lang=en>.
- Regional Environmental Centre for Central Asia. *Workshop on Emissions Trading System in Kazakhstan*. n.d. Accessed June 10, 2014. <http://www.carecnet.org/programmes-and-activities/climate-change-and-sustainable-energy/workshop-on-emissions-trading-system-in-kazakhstan/?lang=en>.
- Rosenau, James N., and Ernst Otto Czempiel. *Governance Without Government: Order and Change in World Politics*. Cambridge [England]: Cambridge University Press, 1992.
- “Rossiya Gotova Snyat Ogranicheniya v Tamojennov Soyuze Esli i Drugie Sdelayut Toje Samoe (Russia Is Ready to Give Up Restrictions in Customs Union if Others Do the Same).” *Voice of Russia, Interfax*, October 25, 2013. Accessed May 5, 2014. http://voiceofrussia.com/news/2013_10_25/Russia-ready-to-give-up-restrictions-in-Customs-Union-if-others-do-the-same-Putin-5313/?slide-1.
- “Rossiya i Kazakhstan Sozdayut Mejdunarodnuyu Gruppu po Kaspiyu (Russia and Kazakhstan are Establishing International Group on Caspian Sea).” *Easttime*, September 21, 2013. Accessed October 15, 2014. <http://easttime.ru/news/kazakhstan/rossiya-i-kazakhstan-sozdayut-mezhdunarodnuyu-gruppu-po-kaspiyu/4766>.
- “Russian Gas Transit to China Through Kazakhstan is Less Viable—Expert.” *ITAR-TASS News Agency*, March 24, 2015. Accessed May 15, 2015 <http://tass.ru/en/economy/784580>.
- Ryabkov, Maxim. Personal Interview, Director of the OSCE Academy. Bishkek, Kyrgyzstan, September 5, 2013.
- Sabonis-Helf, Theresa. “The Rise of the Post-Soviet Petro-States: Energy Exports and domestic Governance in Turkmenistan and Kazakhstan.” In Dan Burghart Theresa and Sabonis-Helf. *In the Tracks of Tamerlane: Central Asia’s Path to the 21st Century*. Washington: National Defense University Center for Technology and National Security Policy, 2004.

- Sadykov, Murat. "After Gazprom Takeover, Southern Kyrgyzstan Marks 24th Day Without Gas." *Eurasianet.org*, May 7, 2014. Accessed January 15, 2015
<http://www.eurasianet.org/node/68347>.
- Salikhov, T. P. "Stages and Results of Energy Strategy Realization in Uzbekistan." *Journal of Economic Review*, 2004.
- "Saparmurat Niyazov Inaugurates Gas Compressor Station at Korpeje Natural Gas Field." *Turkmenistan.ru*, September 14, 2005. Accessed June 20, 2014.
http://www.turkmenistan.ru/?page_id=3&lang_id=en&elem_id=7108&type=event&sort=date_desc.
- Saz, Angel, and Keegan Pierce. "Towards a Global Governance of Energy." *ESADEgeo Position Paper 9*, 2011.
- Schatz, Edward. Comment provided June 9, 2015.
- Scholte, Jan Aart. *Globalization: A Critical Introduction*. New York: Palgrave Macmillan, 2005.
- Skyrms, Brian, and U. C. Irvine. "The Stag–Hunt." *Pacific Division of the American Philosophical Association*, 2001. Accessed February 6, 2014.
<http://www.socsci.uci.edu/~bskyrms/bio/papers/stagHunt.pdf>.
- "The SCO Interbank Consortium Development Strategy Approved." *Vneshekonombank.ru*. November 7, 2011. Accessed March 10, 2014.
http://www.veb.ru/en/press/news/arch_news/index.php?id_19=28511.
- "SCO Member States Agreed to Establish Energy Club." *Kazenergy*, December 9, 2013. Accessed July 5, 2014. <http://kazenergy.com/ru/press/2011-04-21-10-41-35/12013-2013-12-09-04-09-08.html>.
- Secretariat of the Shanghai Cooperation Organization. *Brief Introduction to the Shanghai Cooperation Organization*. Beijing: Shanghai Cooperation Organization, n.d. Accessed July 15, 2014. <http://www.sectsco.org/EN123/brief.asp>.
- Secretariat of the Shanghai Cooperation Organization. *Charter of the Shanghai Cooperation Organization*. Beijing: Shanghai Cooperation Organization, 2009. Accessed July 15, 2014. <http://www.sectsco.org/EN123/show.asp?id=69>.
- Secretariat of the Shanghai Cooperation Organization. *Chronicle of Main Events at SCO in 2007*. Beijing: Shanghai Cooperation Organization, 2007. Accessed January 15, 2013. <http://www.sectsco.org/EN123/show.asp?id=97>.
- Secretariat of the Shanghai Cooperation Organization. *Chronicle of Main Events at SCO in 2009*. Beijing: Shanghai Cooperation Organization, 2009. Accessed July 1, 2014. <http://www.sectsco.org/EN123/show.asp?id=182>.
- Secretariat of the Shanghai Cooperation Organization. *SCO Interbank Consortium*. Beijing: Shanghai Cooperation Organization, 2014. Accessed July 10, 2014. <http://www.sectsco.org/EN123/show.asp?id=514>.

- Secretariat of the Shanghai Cooperation Organization. *The Business Council of the Shanghai Cooperation Organization*. Beijing: Shanghai Cooperation Organization, 2009. Accessed July 13, 2014. <http://www.sectsco.org/EN123/show.asp?id=52>.
- Secretariat of the Shanghai Cooperation Organization. *Treaty on Long-Term Good-Neighborliness, Friendship and Cooperation Between the Member States of the Shanghai Cooperation Organization*. Beijing: Shanghai Cooperation Organization, 2007. Accessed June 15, 2013. <http://www.sectsco.org/EN123/show.asp?id=71>.
- Sehring, Jenniver. *The Politics of Water Institutional Reform in Neo-Patrimonial States: A Comparative Analysis of Kyrgyzstan and Tajikistan*, Springer Science & Business Media, 2009.
- “Serie Zoni’ Tamojennogo Soyuza—Rezul’tat Nedointegracii (‘Grey Zones’ of the Customs Union—the Result of Incomplete Integration).” Eurasian Economic Commission, January 20, 2014. Accessed May 1, 2015. <http://www.eurasiancommission.org/ru/nae/news/Pages/22-01-2014-2.aspx>.
- Serov, Mikhail. “Turkmeniya Nedovol’na ‘Gazpromom’ (Turkmenistan is not Happy about ‘Gazprom’).” *Vedomosti*, February 17, 2015. Accessed May 1, 2015. <http://www.vedomosti.ru/newspaper/articles/2015/02/17/turkmeniya-nedovolna-gazpromom>.
- Shaban, Ilham. “Milestone Year for Turkmen Gas Export to China?” *Natural Gas Europe*, February 10, 2015. Accessed May 25, 2015. <http://www.naturalgaseurope.com/milestone-year-in-turkmen-gas-export-to-china>.
- Shaffer, Brenda. *Energy Politics*. Philadelphia: University of Pennsylvania Press, 2009.
- Shamsiev, Kh. A. “Coordination and Dispatch Center ‘Energy’ Issues of Regional Cooperation within the Central Asia Integrated Power System.” 2009.
- Shanghai Cooperation Organization. *Bishkek Declaration of the Heads of the Member States of the Shanghai Cooperation Organization*. 2007.
- Shanghai Cooperation Organization. *Putin Suggested to Establish an Energy Club of the SCO*. Beijing: Shanghai Cooperation Organization, n.d. Accessed May 20, 2014. http://www.sco-ec.gov.cn/crweb/scor/info/Article.jsp?a_no=33618&col_no=64.
- Sharif Hamid, Sami. Personal Conversation, Director, the Directorate of the Flooding Area of Rogun HPP of the Republic of Tajikistan. Almaty, Kazakhstan, July 15, 2014.
- Sharip, Farkhad. “Uzbekistan’s Quest for Aral Sea Oil May Weaken Kazakhstan’s Position in the Caspian.” *Eurasia Daily Monitor* 9, no. 23 (2012).
- Slaughter, Anne-Marie. *A New World Order*. Princeton: Princeton University Press, 2004.
- Socor, Vladimir. “Aliyev, Erdogan Sign Inter-Governmental Agreement on Trans–Anatolia Gas Pipeline to Europe.” *Eurasia Daily Monitor* 9, no. 122 (June 2012). Accessed May 15, 2015. http://www.jamestown.org/programs/edm/single/?tx_ttnews%5Btt_news%5D=39545&tx_ttnews%5BbackPid%5D=27&cHash=2e9f386bf569ef7ea670cde5a5c3784c#.VaBs6sZViko.

- Socor, Vladimir. "China to Increase Central Asian Gas Imports Through Multiple Pipelines." *Eurasia Daily Monitor* 9, no. 152 (August 2012).
- Socor, Vladimir. "Russia Resuming Gas Imports From Turkmenistan on a Small Scale." *Eurasia Daily Monitor* 7, no. 1 (January 2010).
- Sorbello, Paolo. "Europe and Turkmenistan Make Nice." *The Diplomat*, May 17, 2015. Accessed May 25, 2015. <http://thediplomat.com/2015/05/europe-and-turkmenistan-make-nice/>.
- "Sound Logic Behind Renewable Expansion." *Invest in Kazakhstan* 2013. Accessed June 1, 2015. http://kazakhstan.newsdeskmedia.com/Images/Upload/invest_in_kazakhstan/PDFs/Investment-Opportunities-Power-Energy.pdf.
- Sovacool, Benjamin K. "Evaluating Energy Security in the Asia-Pacific Region: A novel Methodological Approach." *Energy Policy* 38 (2012): 5258–5263.
- Sovacool, Benjamin K. "The Methodological Challenges of Creating a Comprehensive Energy Security Index." *Energy Policy* 48 (2012): 835–840.
- State Agency for Management and Use of Hydrocarbon Resources under the President of Turkmenistan. *Ministry of Oil and Gas Industry and Mineral Resources Journal*. Accessed September 15, 2014. <http://www.oilgas.gov.tm/minagenstvo.html>.
- State Committee of the CIS Member States. *Rossiya i Kazaxstan v Blijayshee Vremya Podpishut Soglashenie o Stroitelstve v Kazaxskom Gorode Kurchatov Atomnoy Elektrostancii (Russia and Kazakhstan Will Sign an Agreement to Build in the Near Future Nuclear Power Plant in the City of Kurchatov in Kazakhstan)*. 2014. Accessed June 20, 2014. <http://sng-atom.com/?q=node/448>.
- Stevens, Paul. *Transit Troubles: Pipelines As a Source of Conflict*. [London, England]: Chatham House, 2009.
- Strange, Susan. *The Retreat of the State: The Diffusion of Power in the World Economy*. New York: Cambridge University Press, 1996.
- Strategy for Regional Cooperation in the Energy Sector of CAREC Countries*. Baku, Azerbaijan: Seventh Ministerial Conference on Central Asia Regional Economic Cooperation, 2008. Accessed March 24, 2015. <http://www.carecprogram.org/uploads/docs/CAREC-Regional-Cooperation-Strategy-in-Energy.pdf>.
- Stratfor Contributor. "Difficulties Loom For A Turkmen-China Energy Deal." *Forbes*, August 3, 2011. Accessed December 4, 2013. <http://www.forbes.com/sites/energysource/2011/03/08/difficulties-loom-for-a-turkmen-china-energy-deal/>.
- Sultanbekova, Aygul. Advisor to the Government of Kyrgyz Republic on Power Sector Development, Personal Interview. Bishkek, Kyrgyzstan, February 7, 2014.
- Surkov, Nikolay. "Evraziyskiy Ekonomicheskiy Soyuz v Zamen Tamojennogo Soyuza (Eurasian Economic Union to Replace the Customs Union)." *RBTH*, October 28, 2013. Accessed March 5, 2014.

- http://rbth.co.uk/international/2013/10/28/eurasian_economic_union_to_replace_customs_union_31237.html.
- Svoik, Petr. Personal Interview, Engineer and Expert on Energy Sector Development of Kazakhstan. Almaty, Kazakhstan, July 20, 2014.
- “Tajikistan—Energy.” GlobalSecurity.org—Reliable Security Information. Accessed October 12, 2014. <http://www.globalsecurity.org/military/world/centralasia/tajik-energy.htm>.
- “Tajikistan Strategic Partnership.” Gazprom Official Website, n.d. Accessed May 5, 2015. <http://www.gazprom.com/about/production/projects/deposits/tajikistan/>.
- “Tajikistan.” Gazprom International, n.d. Accessed June 1, 2015. <http://gazprom-international.com/en/operations/country/tajikistan>.
- Tarr, David and Eskender Trushin. “Did the Desire for Cotton Self-Sufficiency Lead to the Aral Sea Environmental Disaster?” In “Revisiting Water Issues in Central Asia: Shifting from Regional Approach to National Solutions.” By Nariya Khasanova, *Central Asia Fellowship Papers*, no. 6, October 2016. Accessed June 1, 2015. <https://app.box.com/s/fornzf5490xyou1juaw0>.
- Teshabaev, Ilkhom. Personal Interview, ADB Project Manager in Uzbekistan. Tashkent, Uzbekistan, June 20, 2013.
- The Ministry of Foreign Affairs of Turkmenistan. “Economy,” (n.d.). Accessed May 15, 2015. <http://www.mfa.gov.tm/en/turkmenistan/economy>.
- Toft, Peter, Arash Duero, and Arunas Bieliauskas. “Terrorist Targeting and Energy Security.” *Energy Policy* 38, no. 8 (2010): 4411–4421. doi:10.1016/j.enpol.2010.03.070.
- “Toktogulskaya GES Mojet Ostanovitsya k Vesne 2015 Goda (Toktogul HPP Can Stop Operating by Spring 2015).” 2014. Accessed January 1, 2015. <http://www.stanradar.com/news/full/12811-toktogulskaja-ges-mozhet-ostanovitsja-k-vesne-2015-goda.html>.
- Tolipov, Farkhod. Personal Interview, Director of Bylim Karvoni Nongovernmental Research and Training Center. Tashkent, Uzbekistan, June 29, 2013.
- Tomberg, Igor. “Energy industry in Central Asia – Challenges and Prospects.” *Russian International Affairs Council*, 2012. Accessed March 4, 2013. http://russiancouncil.ru/en/inner/?id_4=350#top.
- Toralieva, Gulnura. “Destruction of Central Asian Electricity Grid: Causes and Implications.” *EUCAM*, no. 8, January 2010.
- Townsend, Jacob, and Amy King. “Sino-Japanese Competition for Central Asian Energy: China's Game to Win.” *China and Eurasia Forum Quarterly* 5, no. 4 (2007): 23–45.
- Trilling, David. “Tajikistan: Rogun Dam a Hot Topic As Tajiks Make It Through Another Winter of Shortages.” *EurasiaNet.org*, March 12, 2009. Accessed May 20, 2013. <http://www.eurasianet.org/departments/insightb/articles/eav031309f.shtml>.

- [illegible]

- US Energy Information Administration (EIA). *Kazakhstan—Analysis*. Washington, DC: U.S. Energy Information Administration (EIA), n.d. Accessed March 20, 2014. <http://www.eia.gov/countries/cab.cfm?fips=KZ>.
- US Energy Information Administration (EIA). *Uzbekistan—Overview/Data*. Washington, DC: US EIA, n.d. Accessed January 7, 2015. <http://www.eia.gov/beta/international/country.cfm?iso=UZB>.
- US Energy Information Administration (EIA). *Statistics: Per Capita Carbon Dioxide Emissions from the Consumption of Energy (Metric Tons of Carbon Dioxide per Person)*. Washington, DC: U.S. Energy Information Administration (EIA), n.d. Accessed January 4, 2015. <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=90&pid=45&aid=8&cid=KZ,KG,TI,TX,UZ,&syid=2007&eyid=2011&unit=MMTCD>.
- US Energy Information Administration (EIA). *Statistics: Total Carbon Dioxide Emissions from the Consumption of Energy (Million Metric Tons)*. Washington, DC: U.S. Energy Information Administration (EIA), n.d. Accessed January 10, 2015. <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=90&pid=44&aid=8&cid=KZ,KG,TI,TX,UZ,&syid=2012&eyid=2012&unit=MMTCD>.
- Umbetaliyeva, Tolganai. Personal Interview. Director of the Central Asian Foundation for the Development of Democracy, Almaty, Kazakhstan, April 1, 2014.
- United Nations Development Programme. *Sustainable Energy for All: Tajikistan: Rapid Assessment and Gap Analysis*. UNDP, 2013. Accessed September 1, 2014. http://www.undp.org/content/dam/tajikistan/docs/library/UNDP_TJK_SE4ALL_Rapid_Assessment_and_gap_analysis_Eng.pdf.
- “UPDATE 1—Russia’s Gazprom Says Files Case Against Turkmengaz Over Gaz Price. *Reuters*, July 24, 2015. Accessed August July 24, 2015 <http://uk.reuters.com/article/2015/07/24/russia-gazprom-turkmenistan-idUKL5N1041GE20150724>.
- Uzinfoinvest. “Oil and Gas Sector.” Accessed May 10, 2015. http://www.uzinfoinvest.uz/eng/investment_opportunities/by_industry/oil_and_gas_sector/.
- “Uzbek Gas Supplies to Southern Kyrgyzstan Resumed.” *The Times of Central Asia*, December 31, 2014. Accessed March 3, 2015. <http://www.timesca.com/news/14814-uzbek-gas-supplies-to-southern-kyrgyzstan-resumed>.
- “Uzbekistan Halts Gas Supply to Tajikistan from January 1.” *The Times of Central Asia*, December 25, 2012. Accessed May 1, 2015. <http://www.timesca.com/news/10619-uzbekistan-halts-gas-supply-to-tajikistan-from-january-1>.
- “Uzbekistan i Kitai: Vzaimovigodnoe Sotrudnichestvo (Uzbekistan and China: Mutually Beneficial Cooperation).” June 6, 2012. Accessed May 5, 2014. http://russian.china.org.cn/exclusive/txt/2012-06/06/content_25591078.htm.
- “Uzbekistan Prekratil Podachu Prirodnogo Gaza na Yug Kirgizii (Uzbekistan Stopped Gas Supply to Southern Kyrgyzstan).” *Kazenergy*. July 18, 2013. Accessed

- November 5, 2014. <http://kazenergy.com/ru/press/2011-04-21-10-41-35/10102-2013-07-17-20-23-18.html>.
- “Uzbekistan to Decrease Gas Supplies to Russia, Increase to China.” *UzDaily*, October 9, 2014. Accessed May 12, 2015 <http://www.uzdaily.com/articles-id-29513.htm>.
- “Uzbekistan Vozobnovil Eksport Gaza v Rossiyu Posle Mesyachnogo Pereryva (Uzbekistan Restored Export of Gas to Russia After a Monthly Disruption).” *Kazenergy*, January 29, 2013. Accessed May 5, 2014. <http://kazenergy.com/ru/press/2011-04-21-10-41-35/7764-2013-01-29-11-07-35.html>.
- “Uzbekistan Withdraws from the Central Asian Power Grid.” *BBC News*, December 1, 2009. Accessed March 5, 2015. <http://news.bbc.co.uk/2/hi/asia-pacific/8388406.stm>.
- Uzbekneftegaz. *Osnovnie Pokazateli (Key Indicators)*. Tashkent: Ung.uz, 2014. Accessed June 1, 2014. <http://www.ung.uz/ru/business/indicators>.
- Uzbekneftegaz. *Perviy Gaz Uzbekistana (Uzbekistan's First Gas)*. Tashkent: Uzbekneftegaz, 2013. Accessed June 1, 2014. http://www.ung.uz/press_center/smi/pervyj_gaz_uzbekistana/.
- Varis, Olli “Resources: Curb Vast Water Use in Central Asia.” *Nature*, October 1, 2014. Accessed January 25, 2015. <http://www.nature.com/news/resources-curb-vast-water-use-in-central-asia-1.16017>.
- Vierbovska-Miazga, Agata. “Customs Union Summit: Crisis Instead of Success.” *OSW*, October 30, 2013. Accessed June 10, 2014. <http://www.osw.waw.pl/en/publikacje/analyses/2013-10-30/customs-union-summit-crisis-instead-success>.
- Viotti, Paul R., and Mark V. Kauppi. *International Relations Theory: Realism, Pluralism, Globalism*. New York: Macmillan, 1993.
- Vivoda, Vlado. “Diversification of Oil Import Sources and Energy Security: A Key Strategy or an Elusive Objective?” *Energy Policy* 37 (2009): 4615–4623. doi:10.1016/j.enpol.2009.06.007.
- Vivoda, Vlado. “Evaluating Energy Security in the Asia-Pacific Region: A Novel Methodological Approach.” *Energy Policy* 38 (2010): 5258–5263. doi:10.1016/j.enpol.2010.05.028.
- “Vse GES Vaxshskogo Kaskada Snizili Proizvodstvo Elektroenergii na 30–40% (All HPPs on the Vaksh Cascade Decreased Power Production to 30–40%).” *Regnum*, December 3, 2013. Accessed March 15, 2014. <http://www.regnum.ru/news/1740123.html#ixzz2vRvfDnNU>.
- Waltz, K. N. *Theory of International Politics*. Random House, 1979.
- Weinthal, Erika. *State Making and Environmental Cooperation: Linking Domestic and International Politics in Central Asia*. Cambridge and London: MIT Press, 2002.
- Weinthal, Erika and Pauline Jones Luong. “Combating the Resource Curse: An Alternative Solution to Managing Mineral Wealth.” *Perspectives on Politics* 4, no. 1 (March 2006): 35–53.

- Weinthal, Erika and Pauline Jones Luong. "Prelude to the Resource Curse: Explaining Oil and Gas Development Strategies in the Soviet Successor States and Beyond." *Comparative Political Studies* (34) 4 (2001): 367–399.
- Welch, David A. "What is "Governance", Anyway?" *Canadian Foreign Policy Journal* 19, no. 3 (2013): 253–267. <http://www.tandfonline.com/loi/rcfp20>.
- Wesley, Michael. *Energy Security in Asia*. New York, NY: Routledge, 2007.
- Dingwerth, Klaus and Philipp Pattberg. "Arenas, Actors and Issues in Global Governance." In *Global Governance*, by Jim Whitman. New York: Palgrave Macmillan, 2009.
- Wilby, Robert L., Michael Friedhoff, Richenda Connell, Ben Rabb, Nasridin Minikulov, Anvar Homidov, and Nadezhda Leonidova. *PPCR Phase I Project A4: Improving the Climate Resilience of Tajikistan's Hydropower Sector*. Pilot Program of Climate Resilience, 2011. Accessed January 5, 2014. [http://www.ppcr.tj/IP/Phase1/Component4/ppcr_a4_draft_final_report_13oct11%20\(Final%20Report\).pdf](http://www.ppcr.tj/IP/Phase1/Component4/ppcr_a4_draft_final_report_13oct11%20(Final%20Report).pdf).
- Winzer, Christian. "Conceptualizing Energy Security." *Energy Policy* 46 (2012): 36–48.
- World Bank Group. *Central Asia Energy-Water Development Program*. Washington, DC: World Bank, n.d. Accessed May 10, 2014. <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/ECAEXT/0,,contentMDK:22743346~pagePK:146736~piPK:146830~theSitePK:258599,00.html>.
- World Bank Group. *Electric Power Transmission and Distribution Losses (Percent of Output)*, Washington, DC: World Bank, n.d. Accessed May 10, 2014. http://data.worldbank.org/indicator/EG.ELC.LOSS.ZS?order=wbapi_data_value_2011+wbapi_data_value+wbapi_data_value-last&sort=asc.
- World Bank Group. *Fossil Fuel Energy Consumption (% of Total)*. Washington, DC: World Bank, n.d. Accessed January 15, 2015.
- World Bank Group. *Pump Price for Gasoline (US\$ Per Liter)*. Washington, DC: World Bank, n.d. Accessed January 15, 2015. <http://data.worldbank.org/indicator/EP.PMP.SGAS.CD?display=default>.
- World Bank Group. *Tajikistan's Winter Energy Crisis: Electricity Supply and Demand Alternatives*. Washington, DC: World Bank, 2013. Accessed October 1, 2014. <http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:23319658~pagePK:64257043~piPK:437376~theSitePK:4607,00.html>.
- World Bank Group. *Uzbekistan: The Economics of Efficiency. Uzbekistan Pushes to Reduce Energy Consumption in Industry*. Washington, DC: World Bank, 2013. Accessed May 1, 2014. <http://www.worldbank.org/en/results/2013/04/30/uzbekistan-the-economics-of-efficiency>.
- World Bank. *Assessment Studies for Proposed Rogun Hydropower Project in Tajikistan*. Washington, DC: World Bank, 2014. Accessed November 6, 2014. <http://www.worldbank.org/en/region/eca/brief/rogun-assessment-studies>.
- World Bank. *CASA-1000 Project Risk Assessment*. Washington, DC: World Bank, n.d. Accessed May 7, 2014.

- <http://www.worldbank.org/content/dam/Worldbank/document/eca/central-asia/CASA-1000-Project-Risk-Assessment-en.pdf>.
- World Bank. *Central Asia Energy-Water Development Program*. Washington, DC: World Bank, 2013. Accessed May 5, 2014. <http://www.worldbank.org/en/region/eca/brief/caewdp>.
- World Bank. *Central Asia Regional Workshop on Environment and Climate Change: Learning, Partnerships, And Knowledge Exchange*. Washington, DC: World Bank, 2013. Accessed May 1, 2014. <http://www.worldbank.org/en/news/press-release/2013/01/24/central-asia-workshop-environment-climate-change>.
- World Bank. *Final Reports Related to the Proposed Rogun HPP*. Washington, DC: World Bank, 2014. Accessed November 5, 2014. <http://www.worldbank.org/en/country/tajikistan/brief/final-reports-related-to-the-proposed-rogun-hpp>.
- World Bank. *Report on the 5th Riparian Information-Sharing and Consultation Process on the Assessment Studies of a Proposed Rogun Hydropower Project*. Europe and Central Asia Region World Bank, 2014. Accessed May 8, 2014. http://www.worldbank.org/content/dam/Worldbank/document/eca/central-asia/Rogun%20Assessment%20studies%20Fifth%20Consultation%20Report_eng.pdf.
- World Bank. *To Executive Secretary, The Inspection Panel*. 2010. Accessed May 10, 2014. http://siteresources.worldbank.org/ECAEXT/Resources/258598-1297718522264/Request_for_Inspection_Eng.pdf.
- World Bank. *World—Central Asia South Asia Electricity Transmission and Trade Project (CASA 1000)*. Washington, DC: World Bank, 2012. Accessed May 5, 2014. <http://documents.worldbank.org/curated/en/2012/06/16435491/world-central-asia-south-asia-electricity-transmission-trade-project-casa-1000>.
- World Bank. *Electricity Production from Hydroelectric Sources (percent of total), for 2011*. Washington, DC: World Bank. Accessed June 1, 2015. <http://data.worldbank.org/indicator/EG.ELC.HYRO.ZS>.
- World Bank. “Environment and Social Impact Assessment for Rogun Hydro Power Plant, Analysis of Alternatives.” V Round of dialogue on Technical and Economic/Environmental and Social Impact Assessment of the Rogun, Almaty, Kazakhstan, July 14, 2014.
- World Bank. “Environment and Social Impact Assessment for Rogun Hydro Power Plant, Environmental and Social Impacts.” V Round of Dialogue, Almaty, Kazakhstan, July 14, 2014.
- World Bank. “Feature Story. Study shows TALCO’s Potential to Save Energy.” Washington, DC: World Bank, 2013. Accessed May 25, 2015. <http://www.worldbank.org/en/news/feature/2013/01/28/study-shows-talco-potential-save-energy>.
- World Bank. *GDP (Current US\$) for 2013*. Washington, DC: World Bank, 2015. Accessed March 1, 2015. <http://data.worldbank.org/indicator/NY.GDP.MKTP.CD/countries/XD-XM?display=default>.

- World Bank. “Q&A with Saroj Kumar Jha, Regional Director for Central Asia, on the Current Status of the Rogun Assessment Studies.” Speech, Third Riparian Meetings on Rogun Assessment studies, August 12, 2012.
- Yakobashvili, Timuri. “A Chinese Marshal Plan for Central Asia?” *CACI Analyst*, 2013. Accessed March 20, 2014. <http://cacianalyst.org/publications/analytical-articles/item/12838-a-chinese-marshall-plan-for-central-asia?.html>.
- Yaziev, Kurganguly. “Potencial Turkmenistana po Narashivaniyu Eksporta Prirodnogo Gaza (Potential for the Gas Export of Turkmenistan).” *Ministry of Oil and Gas Industry and Mineral Resources Journal*. Accessed June 1, 2015. <http://www.oilgas.gov.tm/publikatsii/item/329>.
- Yergin, Daniel. *The Quest: Energy, Security and the Remaking of the Modern World*. New York: Penguin Press, 2011.
- Yusupov, Alexey. Personal Interview, Friedrich Ebert Foundation Head of Office Almaty. Almaty, Kazakhstan, October 15, 2013.
- Yuldoshev, Avaz and Victoria Naumova. “Uzbekistan Plans to Pull out of Central Asia’s Power Grid Next Month.” *ASIA-Plus*, November 7, 2009. Accessed March 20, 2015. <http://www.news.tj/en/news/uzbekistan-plans-pull-out-central-asia-s-power-grid-next-month>.
- Zakhidov, R. A. “Central Asian Countries Energy System and Role of Renewable Energy Sources.” *Applied Solar Energy* 44, no. 3 (2008): 218–223.
- Zhang, Yingnan. “World Small Hydropower Development Report 2013-Turkmenistan.” *United Nations Industrial Development Organization (UNIDO) and International Center on Small Hydro Power (ICSHP)*, 2013. Accessed March 2, 2015. http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Asia_Central/WSHPDR_2013_Turkmenistan.pdf
- Zhumagulov, Nurlan. “Fakti i Cifri Neftegazovoy Otrastli Kazaxstana za 2013 God (Facts and Figures of Kazakhstan’s Oil and Gas Industry for 2013).” *YourVision*, 2014. Accessed October 1, 2014. http://yvision.kz/post/405781#comment2555459?utm_source=last_comments&utm_medium=main&utm_campaign=last_comments.